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THE ARMY DEPLOYMENT SIMULATOR WITH A DATA BASE OF ARMY UNITS AN--ETC(U)

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UNCLASSIFIED R-1893-PR NL

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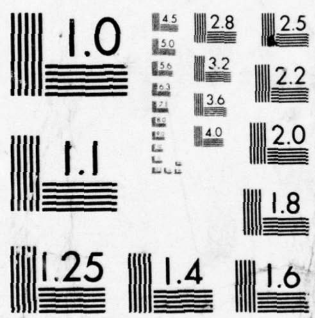

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R-1893-PR
September 1976

The Army Deployment Simulator with a Data Base of Army Units and Equipment

James H. Hayes and Leola Cutler

A report prepared for

UNITED STATES AIR FORCE PROJECT RAND

Rand
SANTA MONICA, CA. 90406

The research described in this report was sponsored by the United States Air Force under Contract No. F44620-73-C-0011 — Monitored by the Directorate of Planning, Programming and Analysis, Deputy Chief of Staff, Research and Development, Hq USAF.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER
R-1893-PR

2. GOVT ACCESSION NO.

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
The Army Deployment Simulator (With a Data Base of Army Units and Equipment)

5. TYPE OF REPORT & PERIOD COVERED
Interim

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)
James H. Hayes and Leola Cutler

8. CONTRACT OR GRANT NUMBER(s)
F44620-73-C-0011

9. PERFORMING ORGANIZATION NAME AND ADDRESS
The Rand Corporation
1700 Main Street
Santa Monica, Ca. 90406

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
FCRC Office (AF/RDXTR)
Director of Planning, Programming & Analysis
Hq USAF, Washington, D.C. 20330

12. REPORT DATE
September 1976

13. NUMBER OF PAGES
163

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

15. SECURITY CLASS. (of this report)
UNCLASSIFIED

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)
Approved for Public Release; Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)
No restrictions

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Army
Deployment
Computerized Simulation
Air Transportation
Military Mobility
Transport Aircraft
Logistics Planning

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
see reverse side

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

The description of a flexible computer program that simulates the airlift of army units from supply bases to a threatened area. The program can be used on several types of large-scale computer. Inputs tell the computer where men and materiel are, where they must go, and what units and equipment have priority. Also specified are the number and the capabilities of each type of transport aircraft. The size and weight of each type of equipment (actual Army values) are already incorporated. The program selects efficient routes from the onload bases. Observing the assigned priorities, it allocates the aircraft to onload bases, loads them, dispatches them, and reallocates them for additional cargo. It prepares a graph of the cumulative deliveries over some specified interval. Operations of considerable complexity (an example is given in full detail) can be simulated quickly -- typically with less than 10 minutes computer time. (BK)

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PREFACE

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This report describes a recently completed, low-level-of-effort revision and update of an existing Rand computer program used to simulate the airlift of army units to areas of actual or potential combat. The program is one of the research tools maintained at Rand for use in Project RAND mobility studies.

A description of the original computer program was published in Rand Memorandum RM-4219-ISA (abridged), *The Army Deployment Simulator*, by William F. Sharpe, March 1965. It was developed for use in connection with policy analyses then being undertaken by the Office of the Assistant Secretary of Defense for International Security Affairs.

The original program had been prepared, of course, for the computers then in being. In the intervening years newer and more powerful computers have become available. Some changes have been necessary to adapt the original program for use in these newer machines. In addition, as with many research tools, new uses have been found for the simulation model. Over the years of use at Rand, for example, a requirement has grown for an ability to examine and to display in hard-copy form the results of studying new mobility systems and various deployment options. The present version of the Army Deployment Simulator incorporates these and other necessary changes, but leaves all of Sharpe's creative work intact.

This simulation model and its data base should be useful to planners who wish to test the capabilities of various types of currently available mobility aircraft and to examine readiness requirements for mobility forces. A user can set up the data for the deployment of army forces in a few hours, even for the most complicated cases: ten divisions, for example, with their support increments, from widely scattered locations. Less complicated and smaller deployments can be set up in correspondingly less time. Since the data herein derive from the Army's own data banks, the weights of the units listed in this report are assumed to be in close agreement with what could be expected to be realistic operational mobility requirements.

Planners should also find the model useful for testing new concepts for mobility aircraft. Once the desired design characteristics of a contemplated type of aircraft are entered into the model, the capabilities of a resultant mobility force of some given configuration and deployment can be obtained as an output for the set of conditions postulated.

The present revision and the update of the computer program were executed by Leola Cutler. The data base was completed by James H. Hayes. This work was done under the Project RAND "Strategic Mobility" research project.

SUMMARY

This report describes a computer program designed to simulate the deployment of army units via transport aircraft from tranquil locations to an area of actual or potential combat. The program is written in FORTRAN and can easily be adapted for use on any of several large-scale computers.

The program requires as inputs a description of the locations of bases (onload, enroute, and offload), the locations and compositions of various army units and prepositioned sets of equipment, the characteristics of one or more types of transport aircraft, and a statement of the priorities to be assigned to the airlift of different army units. Given the basic input data, the program:

1. Selects efficient *routes* for the various aircraft types to and from each of the onload bases.
2. Performs a detailed *loading* of each aircraft.
3. *Allocates* aircraft to onload bases.
4. Prepares a graph of the cumulative deliveries of personnel and cargo at the offload area during the deployment.

A typical deployment problem is used here to illustrate these various phases of the system.

Operations of considerable complexity can be simulated with relatively little computer time (typical cases require less than 10 minutes on an IBM 370). Executed properly, the program provides a useful tool for research on problems connected with the deployment of army units by air.

CONTENTS

I. INTRODUCTION

This report describes a computer program designed to simulate the deployment of army units via transport aircraft from quiet locations to an area of actual or potential combat. Although such deployments have been studied rather extensively in the past, many important aspects require further analysis. The Army Deployment Simulator saves computation time because it electronically loads, dispatches, and unloads thousands of tons of army materiel via transport aircraft. It does this quickly (typically in less than 10 minutes per run) for up to 49 onload bases and one offload base at any desired locations. Up to 10 different types of transport aircraft can be used in each simulation and about a dozen differently composed army units can be deployed. Furthermore, the program is relatively inexpensive ($1.00 to $10.00 per simulation, depending on the complexity), and it can give for this a variety of data outputs (detailed later) that are of use to the analyst.

To make the program inexpensive, however, a number of simplifying assumptions have been necessary; it is thus essential that the user be familiar with its logical structure; otherwise he runs the risk of using it improperly or, even worse, using it for a problem for which it is completely unsuited.

The program is designed for use on the IBM 370/158 computer. However, since it is written in the FORTRAN IV programming language (with the exception of one subroutine) it can be adapted easily for use on any one of several large-scale computers.

In this report we use an army deployment problem to illustrate various aspects of the simulator program. Section II describes the general structure of the simulator. Sections III and IV, respectively, examine the route network of the program and the aircraft loading phase. Section V discusses the program outputs. Complete listings of the inputs and outputs for the sample problem are included in the Appendixes.

II. GENERAL STRUCTURE

Figure 1 illustrates a relatively simple deployment problem using, as an example, each of the data input cards. There is a network of *bases* (Hood, Hickam, etc.) connected by links (e.g., Goose-Hickam or Hickam-Dover). The object of the deployment is to deliver certain army units to Frankfurt, the *offload base*. Highest priority is given to delivering an airborne division, second priority to delivering one infantry division and one armor division, third priority to delivering an armored cavalry regiment. To provide the materiel and personnel for these three *priority groups*, 230 transport aircraft are available to airlift them from one or more onload bases. In this case, four onload bases are indicated. A complete infantry division is stationed at Hickam, a complete armor division at Fort Hood, a complete airborne division at Fort Campbell, and a cavalry regiment at Fort Bliss. The materiel and personnel available at the four locations are summarized in seven *stock lists*, each of which indicates the quantity of various items available at the location specified. Each stock list is further identified by a *flag number* in order to facilitate processing and provide the user with greater flexibility.

Three types of aircraft are available for the deployment. Thirty C-5As arrive at Campbell, the first at hour D+0 (i.e., the first hour of deployment) and arriving every 30 minutes thereafter (0.5 hour). These aircraft are all required to move items from the stock list with flag number 1 (i.e., vehicles) on their initial delivery to the offload base. One hundred C-141As arrive at Campbell, beginning at D+10 hours, and arriving every half-hour thereafter. These latter aircraft are required to take items from the stock list with flag number 1 (vehicles) to the extent needed for priority group 1. One hundred C-141C* aircraft also arrive at D+10 hours. If the 100 sorties of C-141As are more than sufficient to move these vehicles, the later arrivals (C-141As and

*The C-141C is labeled in the program "C-142" to distinguish it from the C-141A. It is introduced solely as an example of a personnel carrier.

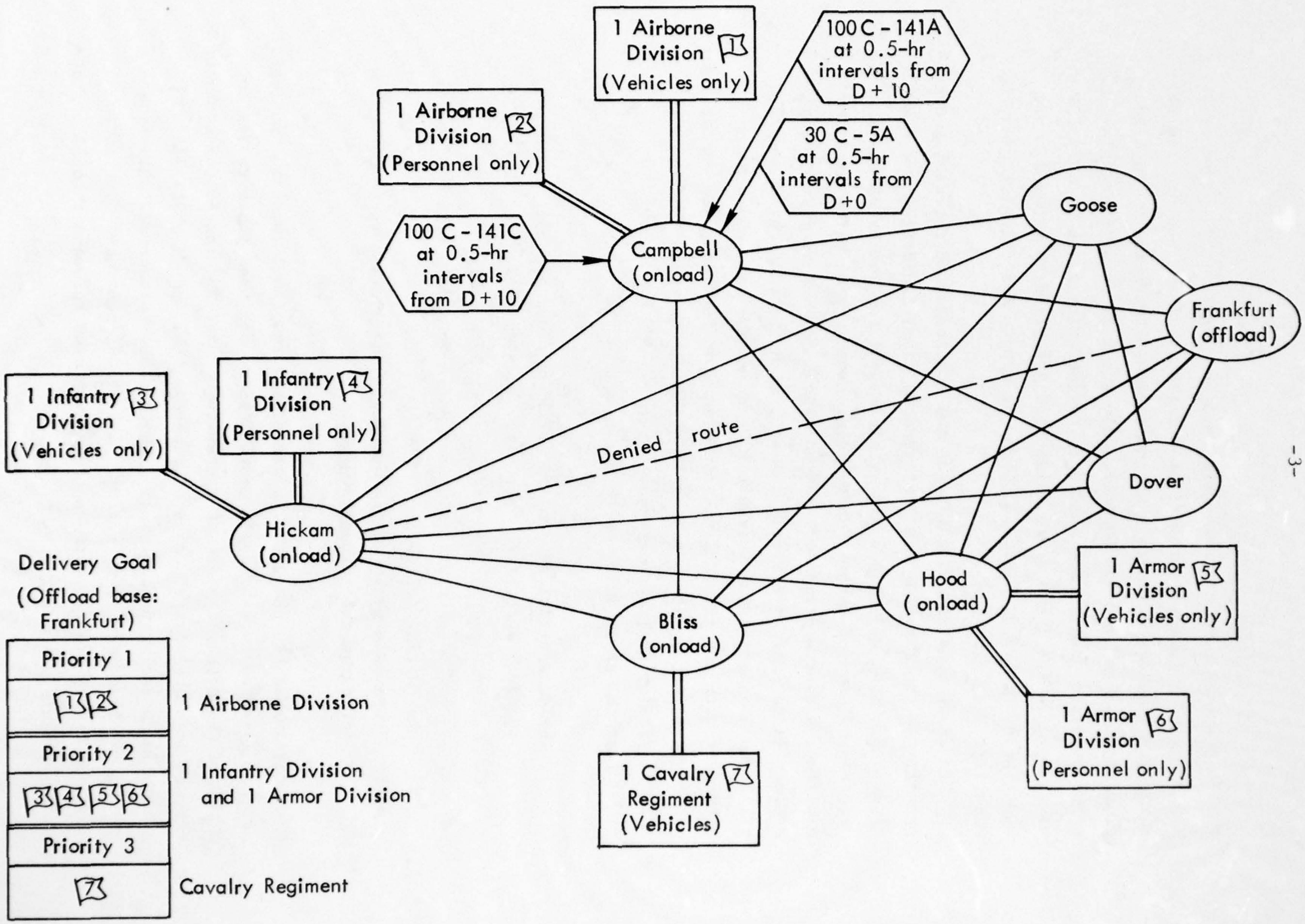

Fig. 1—Deployment example

C-141Cs) are allowed to take items from the list with flag number 2 (passengers). Following the first aircraft arrival, the program will route and reallocate aircraft to those onload bases where the highest priority will be served. However, only stock lists with certain flag numbers may be used in the loading. For priority group 1, only lists with flag numbers 1 and 2 are eligible. For priority group 2, only those with numbers 3, 4, 5, and 6 may be used. For priority group 3, only list 7 is eligible.

To allow easy specification of the stationing of materiel and personnel, the program uses a set of *vehicle data*, indicating the dimensions and weight of various army vehicles and the number of these required by each of several units (e.g., infantry division, armored division, airborne division). In addition, one may include several *vehicle lists* that effectively isolate, with the computer's memory, all items so specified. Thereafter, the analyst may move a given army unit with the listed items included (for instance, all tanks, all helicopters, etc.), or he may exclude those items from the move for some particular analytic purpose.

Given the input data, the program:

1. Selects efficient *routes* for the various aircraft types to and from each of the potential onload bases.
2. Performs a detailed *loading* of each aircraft.
3. *Allocates* aircraft to onload bases for all sorties following the initial deliveries.
4. Prepares a graph of the cumulative deliveries of personnel and cargo for the deployment.

The program has two phases. The first performs the network and analysis, selecting routes for the deployment. The second uses these routes to simulate the actual deployment operation. For convenience, one computer run can simulate several cases of repeating the inputs required for the second phase without repeating the possibly extensive analysis required to select efficient routes. A section, below, is devoted to each phase; the problem shown in Fig. 1 is used throughout to illustrate how inputs are prepared.

III. NETWORK PHASE

INPUTS

Title and Parameters (card type 00)

Each input card must be identified by a *card type number* in columns 1 and 2. The first two cards are both type 00; the initial one provides a title for the case, the second indicates the values to be assigned to various parameters. Three of the parameters are used in the loading process; they indicate the amounts to be added to the width, the height, and the length of each vehicle in a cargo to allow for clearance. These numbers may be zero if desired.* Another parameter indicates the units of time in which the simulation results are to be recorded. An increment of four hours, for example, will result in records indicating the cumulative deliveries at the combat zone 4 hours after the beginning of the deployment, 8 hours, 12 hours, etc. Only 200 increments are available for such records, so the increment should not be made too small, since many of the deliveries would then be aggregated to the last (200th) time increment. If no increment is specified, the program will use 12-hour intervals. For large deployments, an interval of 48 hours has proved useful.

The remainder of the parameter card is normally left blank, indicating that only the standard output is desired. In certain cases, however, additional information may be necessary. By placing the numeral 1 in the appropriate position, any of the eight optional outputs described in Sec. V can be obtained.

Figures 2 and 3 illustrate the preparation of type 00 cards.

Vehicle Data (card type 01)

The program can handle as many as 200 different types of vehicle.

---

*Unless otherwise indicated, all numbers should be right-justified (i.e., placed as far to the right side of the field as possible) if integer values are used; fractional quantities may be punched at any position within the field by including a decimal point.

TITLE

01	02	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
0	0			A	T	L	A	N	T	I	C		D	E	P	L	O	Y	M	E	N	T		F	O	R		N	A	T	O																																																

Fig.2—Title card

Columns	01–02	06–10	11–15	16–20	21–25	30	35	40	45	50	55	60		66–80
		Clearances				Optional Tables: Punch 1 if Table Desired								
Field		Width (inches)	Height (inches)	Length (inches)	Hours in Each Increment	Distance Table	Vehicle Data	Priority Group Graphs	Aircraft Release Times	Priority Group Composition	Activity at Off-Load Base	Loads on Initial Aircraft	Loads on All Sorties	
Punched	0 0	4	0	0	4 8	1	1	1	1	1	1	1		

Fig. 3—Parameter card

One card must be prepared for each type of equipment ("men" being one type); on the card are the name or line number of the equipment (no more than six characters), a serial number (any desired unique integer), its dimensions, its weight, and the quantities required in each of up to 11 army units. (These quantities must be integer values.) Our example uses some of the standard set of vehicle data that are incorporated in this version of the model. The units in this set (see Fig. 4 and the first page of Appendix C) are:

1. Infantry division (8-1-1)*
2. Armored division (0-6-5)*
3. Mechanized division (0-4-6)*
4. Airborne division
5. Airmobile division
6. Infantry and airborne division: initial support increment
7. Armored and mechanized division: ISI
8. Airmobile division: ISI
9. Not used (to allow independent data input)
10. Independent tank brigade
11. Armored cavalry regiment

In order to simplify the processing, personnel are treated as a vehicle subject to the following rules:

1. The first vehicle data card *must* describe personnel.
2. Clearance requirements are *not* added to personnel dimensions.
3. Personnel height is not used by the program and may be left blank.

The format for preparing vehicle data cards is illustrated in Fig. 4. Appendix A includes a complete list of the vehicle data used in the example.

---

*The figures in parentheses refer to the number of infantry, tank, and mechanized battalions in that order.

Vehicle Lists (card type 02)

As many as five different vehicle lists may be specified. Each one contains the serial numbers of from 1 to 100 of the vehicle types listed on the vehicle data cards. At least one list *must* be specified; experience indicates that "men" is the most frequently used one. Three such lists are illustrated in Fig. 5; one containing only personnel (list 1), one enumerating helicopters (list 2), and one including 3 types of outsize tracked vehicles on tank chassis (list 3). In some applications there will be no need to use vehicle lists; in such cases no type 02 cards need be included in the data deck.

Base Data (card type 03)

As many as 50 bases may be used in a deployment. Each base must be described on a base data card that indicates its name (up to six characters), an identifying number (any unique integer value*), its ground time (described below), and its latitude and longitude. Latitudes in the southern hemisphere should be indicated by prefixing a minus sign to the *degree* figure. Longitude *west* should also be indicated by prefixing a minus sign to the degree figure. This device compensates for the inability of the computer to store "-0." Figure 6 gives the base data for the example. For -0 degrees 40 minutes, use -360 degrees 40 minutes.

The base ground times represent one of two possible sources of ground time used in calculating deployment times. The other component is based on the parameter value--ground time per flying hour--specified for each aircraft type (on card type 06). If an aircraft stops at a base it must remain on the ground for the ground time specified for that base *plus* a duration equal to the product: (ground time per flying hour) × (flying hours since the previous stop). If, for example, an aircraft flies eight hours from base A to base B, two hours is the specified ground time at B, and the ground time per flying hour is 0.5, total ground time at B would be six hours (2 + 0.5 × 8).

---

*The network analysis will require fewer iterations if base numbers are assigned so that the numbers generally increase as one moves from onload bases to the offload base; however, the program does not require any such numbering scheme.

01-02	Vehicle Name (05-10)	Vehicle Number (11-15)	Width (inches) (16-20)	Height (inches) (21-25)	Length (inches) (26-30)	Weight (pounds) (31-36)	Quantity in Unit 1 (37-40)	Quantity in Unit 2 (41-44)	Quantity in Unit 3 (45-48)	Quantity in Unit 4 (49-52)	Quantity in Unit 5 (53-56)	Quantity in Unit 6 (57-60)	Quantity in Unit 7 (61-64)	Quantity in Unit 8 (65-68)	Quantity in Unit 9 (69-72)	Quantity in Unit 10 (73-76)	Quantity in Unit 11 (77-80)
01	MEN	1	30		20	240	1669	1679	1649	1413	1773	1827	1771	1605	- - -	421	325
01	X40009	19	96	81	265	15180	453	473	437	122	90	697	691	624		91	82
01	V13101	42	144	129	325	97000	54	324	216			17		17		117	

NOTE: PERSONNEL STRENGTHS FOR THE ILLUSTRATIVE EXAMPLE FOR ALL UNITS SHOWN MUST BE MULTIPLIED BY A FACTOR OF 10. SEE SECTION IV FOR INSTRUCTIONS.

Fig. 4—Vehicle data

01-02	List Number (05)	Vehicle Number (06-10)	Vehicle Number (11-15)	Vehicle Number (16-20)	Vehicle Number (21-25)	Vehicle Number (26-30)	Vehicle Number (31-35)	Vehicle Number (36-40)	Vehicle Number (41-45)	Vehicle Number (46-50)	Vehicle Number (51-55)	Vehicle Number (56-60)	Vehicle Number (61-65)	Vehicle Number (66-70)	Vehicle Number (71-75)	Vehicle Number (76-80)
02	1	1														
02	2	24	54	111												
02	3	36	41	42												

Fig. 5—Vehicle lists

The provision of these two types of ground time allows the user to: (1) employ the philosophy that all ground time, maintenance, and servicing are a function of flying time (by setting all base ground times to zero); (2) employ the philosophy that all ground time is a function of sorties (by setting ground time per flying hour to zero); or (3) adopt any desired combination of the two. Needless to say, the approach adopted may have a major impact on the results of the deployment.

Link Data (card type 04)

As indicated above, a link connects two bases. Unless otherwise directed, the program automatically computes the great circle distance between every pair of bases* and places the link in the network. A link data card is entered if the user, for either of two reasons, wants the program not to compute the link distance. (1) In order to take restrictions on overflight into account, the user may enter the link distance himself. (2) He may wish to *deny* the use of a link, in which case he enters a card bearing only the air base designations, leaving the distance field blank (Fig. 7). The nonstop distance between the bases will then be the shortest possible flight pattern using links that have not been denied. If one or more of the bases indicated on a link data card was not described by a base data card, the link will be rejected, a message will be printed, and the processing will continue. If not required for the problem, link data cards may be omitted.

Offload and Onload Bases (card type 05)

To determine all routes that may be needed in a simulation, the offload base and *all* onload bases to be used in *any* of the cases to be run must be indicated on the type 05 card. Figure 8 illustrates this information prepared for our example. A blank field terminates the

---

*The distance is based on the arc length associated with the central angle between the two bases, assuming that the earth has a constant radius of 3433.98 nautical miles. Due to differences in the actual radius at various points, the resulting distances will only approximate the true figures. For this purpose, however, they should be more than adequate.

01–02	Base Name (05–10)	Base Number (11–15)	Ground Time (16–20)	Latitude (+N/−S) Degrees (21–27)	Latitude Min (29–30)	Longitude (+E/−W) Degrees (31–37)	Longitude Min (39–40)
03	BLISS	11	0	31	51	-106	23
03	CAMPBL	12	0	36	40	-87	29
03	HOOD	13	0	31	04	-97	50
03	DOVER	14	0	39	08	-75	28
03	GOOSE	15	0	53	19	-60	26
03	HICKAM	16	0	21	20	-157	55
03	FRANKF	17	0	50	02	8	34

Fig. 6— Base data

01–02	Base Numbers From (06–10)	Base Numbers To (11–15)	Distance (n mi.) Blank if Link Denied (16–20)
04	16	17	

Fig. 7— Link data

01 02		Offload Base No. 06–10	Onload Base No. 11–15	Onload Base No. 16–20	Onload Base No. 21–25	Onload Base No. 26–30	Onload Base No. 31–35	Onload Base No. 36–40	Onload Base No. 41–45	Onload Base No. 46–50	Onload Base No. 51–55	Onload Base No. 56–60	Onload Base No. 61–65	Onload Base No. 66–70	Onload Base No. 71–75	Onload Base No. 76–80
0 5		1 7	1 1	1 2	1 3	1 6										

Fig. 8—Offload and onload bases

list. If more than 14 onload bases are to be used, the 15th is indicated in columns 11 through 15 of a second type 05 card, the 16th in columns 16 through 20, etc. Additional cards may be used in the same manner if required.

Aircraft Type Data (card type 06)

As many as 10 aircraft types can be used simultaneously in a deployment. Each must be described by a type 06 card. Required information includes: the aircraft name, an identifying number (any unique integer), compartment dimensions, passenger capacity, average speed, and ground time per flying hour (explained earlier). The relationship between the aircraft's payload capacity and the longest nonstop distance flown (critical leg) is described by five parameters; their meaning is illustrated in Fig. 9.

The three aircraft types used in the example are described in the standard format shown in Fig. 10. The obviously artificial compartment size shown for the C-141C is a device to insure that no cargo will be loaded in these aircraft. Under these conditions, the passenger capacity figure will be employed, if there is sufficient capacity.* This will serve to allocate C-141Cs only to passenger loads--the desired result.

The last figure on the aircraft type data card indicates the number of bases the aircraft is not allowed to use. Denying one or more bases to an aircraft type can reflect limitations imposed by runway length, maintenance facilities, etc. In some cases it may be desirable to deny the use of a base to *all* aircraft types. If, for example, the great-circle distance from base A to base C involves overflight of hostile territory, the user might enter the distance of a politically feasible route on a link data card. An alternative would be to create one or more "bases" that merely represent corners of an acceptable path. If base B were such a corner, inclusion of links A to B and B to C would

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*This is one of many subterfuges that can be used to employ the program in ways not explicitly described in this document. Similar artifices enable one to simulate the deployment of tactical aircraft and ship movements.

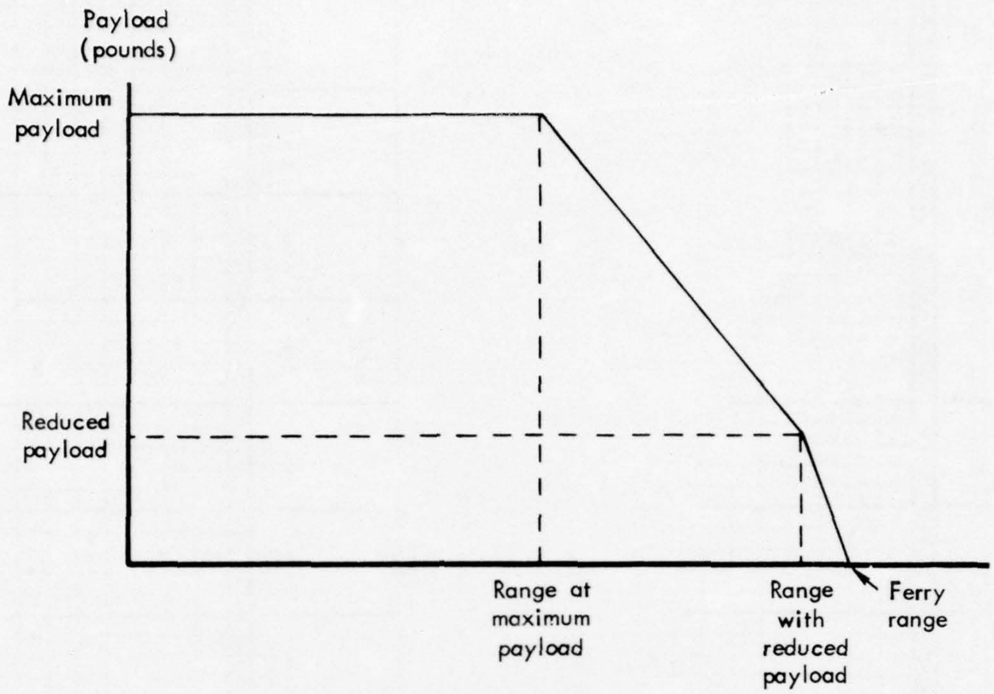

Fig. 9 — Payload/range curve

give the desired result. However, since B is not really a base, it would be denied to all aircraft, to preclude their landing at it (although they may, of course, fly over it).

If one or more bases are to be denied an aircraft type, the required number of *base denial cards* must follow the aircraft type card. Since each base denial card can give the numbers of as many as 15 bases, usually only one card is required. If no bases are to be denied an aircraft type, the final field (columns 76 to 80) on its aircraft type card should be left blank and *no* base denial cards inserted after it.

The format for base denial cards is illustrated in Fig. 11, which indicates the data used for the one base where the C-141C is forbidden to land.

ROUTE SELECTION

The first step in the process of route selection involves the

Cols. 01–02	Cols. 03–04	Aircraft Name	Aircraft Number	Compartment Dimensions: Width (in.)	Compartment Dimensions: Height (in.)	Compartment Dimensions: Length (in.)	Passenger Capacity	Speed (Knots)	Ranges (n. mi.): With Max Payload	Ranges (n. mi.): With Reduced Payload	Ranges (n. mi.): Ferry	Payloads: Maximum	Payloads: Reduced	Ground Time Per Flying Hour	No. of Bases Denied
01 02	03 04	05–10	11–15	16–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–63	64–71	72–77	78–80
06		C-141A	141	123	109	840	120	422	3920	5750	6350	67600	30000	2.0	
06		C-141C	142	1	1	1	120	422	3920	5750	6350	67600	30000	2.0	1
06		C-5A	50	228	162	1453	73	428	3350	5750	6900	215400	105000	2.0	

Fig. 10—Aircraft type data

Cols. 01–02	Cols. 03–05	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number	Base Number
01 02	03–05	06–10	11–15	16–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60	61–65	66–70	71–75	76–80
06		14														

Fig. 11—Base denial card

determination of nonstop distances between all possible pairs of bases. For links that have not been denied, such information is already calculated. For denied links, an alternative route must be calculated. The procedure used is the following. The distance between any two bases is the shortest distance along links which have not been denied. Thus the distance from Hood to Frankfurt will be the shortest of the following routes:

Hood--Frankfurt
Hood--Dover--Frankfurt
Hood--Dover--Goose--Frankfurt

When the shortest route is found, its distance is entered in a nonstop distance table. Thus for *every* pair of bases there will be a nonstop distance, involving movement along accepted links and possible flight over one or more other bases. If there is an error in link distance entered on a link data card, and some alternative route proves shorter than the distance indicated, the program will use the shorter distance. Such a choice can be detected by comparing the distance given in the (optimal) table of shortest allowable nonstop distances with that specified on the link data card.

The remaining calculations are performed separately for each aircraft type. Initially all bases denied to a given aircraft type are deleted from the table. Then a route from the offload base back to each onload base is selected. The route requiring the *minimum time* (flying plus ground time) is chosen in each case, subject to the requirement that no nonstop distance exceed the aircraft's ferry range.*

Following the selection of the minimum-time route *back* from the offload base to an onload base, the route *out* is chosen. The criterion is *maximum flow*. Figure 12 illustrates the relationship between the inputs and the route selected. For simplicity, only thirteen of all the possible routes are plotted in the fourth quadrant, which indicates

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*The algorithm uses a labeling procedure of the type described in L. R. Ford, Jr., D. R. Fulkerson, *Flows in Networks*, The Rand Corporation, R-375-PR (DDC No. AD 287499), August 1962. The solution provides the minimum time from the offload base to all other bases.

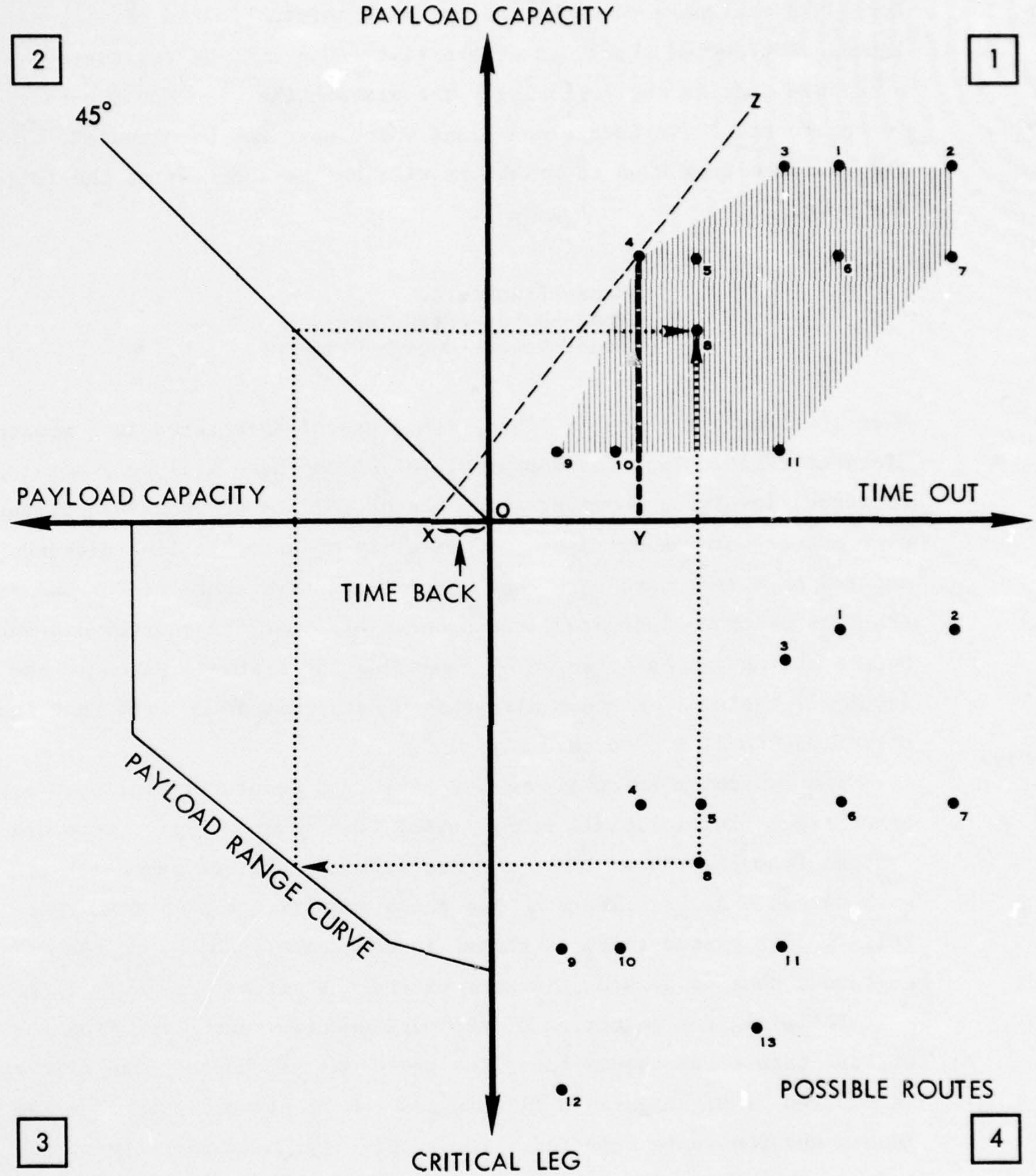

Fig. 12 — Route selection

the time required to move from the onload to the offload base (time out) versus the longest nonstop link (critical leg) on the route. By reference to the payload-range curve in the third quadrant, the payload capacity associated with each route can easily be determined, as shown for route 8.

Routes 12 and 13 are not admissible, since their critical legs exceed the ferry range of aircraft of this type. The others are admissible; however, they provide different combinations of time out and payload capacity, as shown in the first quadrant.

If just one aircraft were to be routed, only combinations of payload capacity and time, shown by the points in the first quadrant, would be relevant. But if many sorties are to be flown, by interpreting the axes as averages per sortie, many alternative combinations of routes become available--all those lying within the shaded area.* The preferred point will, however, be a single route. In Fig. 12, point X is plotted at a distance to the left of the origin equal to the time back for all routes from the onload base (using the same scale adopted for the horizontal axis to the right of the origin). Thus for route 4, the horizontal distance XY represents the round-trip time. The vertical distance from point 4 down to point Y indicates the payload carried per round trip. The ratio of these quantities we define as the *flow*: payload delivered per unit time. Since the flow of any combination will be the tangent of the angle formed by a ray from point X to the combination, it is obvious that the maximum-flow route will lie at the point of tangency between the shaded area and such a ray. As illustrated in Fig. 12, this will be a single route (in this case, route 4).

The computer searching procedure actually employed in the simulation program to obtain the maximum-flow route is quite different from that shown in Fig. 12--most important, it does not require explicit consideration of every possible route. The process is roughly as follows:

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*The shaded area represents the convex hull generated by the points; it is the smallest convex figure containing all the points.

1. Exclude all nonstop distances exceeding the aircraft's ferry range.
2. Find the minimum-time route out from among the remaining combinations.
3. If no route is feasible, go to step 7.
4. If a route is found, record its flow.
5. If the critical leg on this route is less than the aircraft's range at maximum payload, go to step 7.
6. If not, exclude all nonstop distances equal to or greater than this critical leg and return to step 2.
7. (Termination procedure.) From the routes selected by the above process, select the one giving the maximum flow.

This description fails to indicate some of the aspects of the algorithm designed to conserve space in the computer's memory, but it does suggest the essence of the method.

The final step in the network analysis involves the creation of a *payload/time-out table* for each combination of aircraft type and onload base. For each such combination, a maximum-flow route out is established by the process outlined above. The bases on this route are considered the only ones where outbound sorties of this aircraft type from the onload base in question can land. However, they are not *required* to land at all of them. Often the compartment's space is filled before the aircraft's carrying capacity is reached, and an aircraft thus loaded does not *have* to stop at each of the bases specified along the maximum-flow route.* Given some payload below capacity, it would be better to avoid landing at one or more bases enroute if the time out could be reduced by doing so. To allow this, a table indicating the relationship between time out and payload actually aboard is prepared for each combination of aircraft type and onload base.

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*This, of course, calls into question the efficiency of the method by which the outbound route is chosen. In some cases it may be desirable to adjust an aircraft's payload-range curve to better reflect the relationship between the weight actually loaded and the critical leg.

The algorithm is essentially the same as that used to find the maximum-flow route, with two exceptions: (1) only the bases in the maximum-flow route are used, and (2) all routes found are retained.

Two aspects of the payload/time-out table are of interest. First, if compartment size permits, an aircraft is filled to the payload capacity along the maximum-flow route; only when the actual payload falls short of this may a shorter time route be used. Second, although each entry in the table is based on a route that involves *landings* only at bases on the maximum-flow route, in some cases the implied flight path may go *over* quite different bases.

As soon as all required payload/time-out tables have been obtained, the network analysis phase is complete. In order to conserve memory space and reduce running time, the only information retained at the end of this phase is the set of payload/time-out tables and the times back to each onload base for each aircraft type.

IV. LOADING PHASE

INPUTS

Stock Data (card type 07)

After routes have been selected in the network phase of the program, the deployment cases are processed sequentially. Each case consists of a set of cards beginning with type 07 and ending with type 11.

Card type 07 is used to specify the composition of the stock lists to be made available for a deployment. There may be as many as 15 different lists. As shown in Fig. 13, each stock list is given a flag number (any desired unique integer) and must be located at one of the bases in the network. The list itself is formed from one or more components.

Each stock list is, in effect, a menu of vehicles, indicating the available quantity (which may be zero) of each vehicle type (including personnel--the first vehicle type). The flexible way a stock list is formed from one or more components is best indicated by some illustrative, hypothetical examples (not part of our sample problem).

1. The stock list will include twice the quantity of each vehicle type required by unit 1 (as shown on the type 01 cards).

Quantity	Unit	List
2	1	

2. The stock list will include 1.3 times the quantity of each vehicle type required by unit 3. If the product is not an integer it will be rounded *up* to the nearest integer.

Quantity	Unit	List
1.3	3	

3. The stock list will include 1.5 times the quantity required by unit 3 of each vehicle that appears on vehicle list 2 (card type 02). Vehicles not cited on vehicle list 2 will be excluded.

Quantity	Unit	List
1.5	3	+2

4. The stock list will include 1.5 times the quantity required by unit 3 of each vehicle type not cited on vehicle list 2.

Quantity	Unit	List
1.5	3	-2

5. The stock list will be formed from two components, with the quantities added together to form the final list. To form a stock list from two or more components it is only necessary to list the components sequentially. (Needless to say, they must all be given the same flag number and the same base number.)

Flag	Base	Quantity	Unit	List
3	17	1.5	3	+2
3	17	2	1	

The seven stock lists required for our example are described in Fig. 13. The flag numbers are used to preclude delivery of items from certain stock lists to fulfill the needs of particular priority groups. As indicated in the next section, a priority group has the same structure as a stock list. It, too, is simply a menu of quantities of different vehicle types. (Perhaps a better analogy would be a shopping list, since it represents demand rather than supply.) Even though a priority group is formed from airborne division units, for example, there is no automatic provision that keeps the program from obtaining some vehicle (say jeeps) from a stock list that represents an armored division. Only through the use of flag numbers can possibilities such as this be avoided.

In this example, different flag numbers have been assigned each stock list. This is not necessary. One might, for example, assign flag number 1 to all stock lists representing airborne units, and flag number 2 to all lists representing infantry units, and flag number 3 to those representing stocks of prepositioned vehicles. Priority groups representing airborne units could be filled from lists with flag numbers 1 and 3; those representing infantry units from lists with flag numbers 2 and 3.

First Priority Group (card type 08)

The first priority group is composed of those flags that are needed first at the offload base. It states the quantities of the various vehicles/men most required--a set of requirements to be given first priority in the deployment. These needs can only be filled, however, from stock lists that have one of the flag numbers indicated for the priority group. (Other priority groups are listed on card type 10.) The first priority group data for the example are shown in Fig. 14. Although only one component appears in the example, any desired number can be specified. Flag numbers must be repeated on all cards.

Aircraft Arrivals (card type 09)

Any aircraft to be used must be entered into the network at some specified onload base. The aircraft arrivals are specified with type 09 cards--each of which describes the arrival of a group of aircraft of one type at its given base. The program cannot accommodate more than 1,000 aircraft in all; an aircraft group may include from 1 to 1,000 aircraft. The aircraft within each group arrive at a constant rate following an initial delay. If no delay is desired, the "hours before first arrival" may be specified as zero. If all aircraft within the group arrive concurrently, the "time between arrivals" should be set at zero.

01 02	Flag Number (06–10)	Base Number (11–15)	Quantity (16–20)	Unit (21–25)	List + (29)	List No. (30)
0 7	1	1 2	1	4	-	1
0 7	2	1 2	1 0	4	+	1
0 7	3	1 6	1	1	-	1
0 7	4	1 6	1 0	1	+	1
0 7	5	1 3	1	2	-	1
0 7	6	1 3	1 0	2	+	1
0 7	7	1 1	1	1 1	-	1

Fig. 13—Stock data

01 02	Flag Numbers Allowed (06–23)	Quantity (24–30)	Unit (31–35)	List ± (39)	List No. (40)
0 8	1 2	1	4	-	1
0 8	1 2	1 0	4	+	1

Fig. 14—First priority group data

In describing a group of aircraft arrivals, it is essential to indicate two flag numbers of stock lists at the onload base in question.* As long as items needed for the first priority group remain in the stock list with the first flag number specified, they will be selected and will be loaded on any aircraft type that is available and that can carry the equipment. If none remain, however, the stock list with the second flag number specified will be selected. Two flag numbers must be indicated for each group of aircraft arrivals. If only one stock list is to be used, its flag number can be entered in both fields. This has been done for the C-5A arrivals in the example, as shown in Fig. 15.

There is no restriction on the manner of grouping aircraft arrivals. Aircraft of a single type can arrive at several different onload bases (there would be a separate arrival card for each). Moreover, several arrival groups may use the same aircraft type and onload base. This allows the user to represent virtually any desired arrival pattern--rectangular or nonrectangular. It can also be used to avoid certain difficulties that may arise when very large groups of aircraft arrivals are specified.

The program loads and dispatches aircraft for their initial sorties in the order listed on the aircraft arrival cards. Although *within* a group of arriving aircraft the loading proceeds according to arrival time, *between* groups it typically does not. Moreover, all aircraft are loaded for their initial sorties before any recycling from the offload base is begun. For these reasons, the manner of grouping arrivals may affect the results of the simulation.

The aircraft are loaded with items of priority group 1. This is done to the extent that items are available in the stock lists allowed the aircraft group. When loaded, an aircraft is sent to the offload base. If no required items are available on an initial loading, the

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*If priority groups are used, it is of the nature of the model that first-priority materiel be loaded on all types of aircraft. In large deployments this may lead to large numbers of aircraft arriving at one base. This is an artificiality but does not affect the total deployment time.

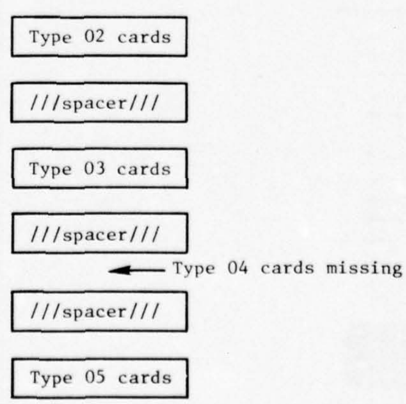
aircraft is sent to the offload base empty and a message printed. When all arrivals have been processed, three (internal) records of the results of the first set of sorties are available. The first gives a list of the aircraft, indicating the time at which each completed the requisite ground time at the offload base, and thus became available for redeployment. The second record indicates the number of personnel delivered to the offload base in each of the 200 time increments. The third gives the weight of all other types of vehicles delivered in each of the time increments.

Remaining Priority Levels (card type 10)

If more than one priority level is desired, the necessary number of type 10 cards must be included (Fig. 16). The components of subsequent priority groups are specified much as those are of the first priority group. Priority groups are listed in order, with the higher priority groups preceding the lower. A change in priority group is indicated by inserting a blank card between the component cards. If only one priority distinction is desired, that priority group is described on the type 08 card and type 10 cards are omitted.

End of Case (card type 11)

In setting up the cards required for one or more deployment cases it is essential that *spacer cards* be included. One of these cards, which are completely blank, must be inserted after each group of cards of a given type. If type 04 cards are omitted, two spacers are used as shown below:



01–02	Base Number (06–10)	Flag No. of 1st Stock List (11–15)	Flag No. of 2nd Stock List (16–20)	Aircraft type (number) (21–25)	Quantity in group (26–30)	Hrs. before First arrival (31–35)	Hours between arrivals (36–40)
0 9	1 2	1	1	5 0	3 0	0	. 5
0 9	1 2	1	2	1 4 1	1 0 0	1 0	. 5
0 9	1 2	2	2	1 4 2	1 0 0	1 0	. 5

Fig. 15—Aircraft arrivals

01–02	Flag Numbers (06–23)	Quantity (24–30)	Unit (31–35)	List ± (39)	List No. (40)
1 0	3 4 5 6	1	1	-	1
1 0	3 4 5 6	1 0	1	+	1
1 0	3 4 5 6	1	2	-	1
1 0	3 4 5 6	1 0	2	+	1
1 0	7 7	1	1 1	-	1

Fig. 16—Remaining priority groups

After the last type 10 card (or, if there are none, after the last type 09 card), there must be a spacer followed by a card with *11* punched in the first two columns to signal the end of a case. If additional cases are to be run, they should follow the type 11 card; the first card following it will be a spacer, followed by the type 07 card describing the first stock list for the new case.

A complete listing of the input data for the deployment example is included in Appendix A.

LOADING PROCEDURE

The procedure followed in loading aircraft during the deployment simulations gives priority to vehicles over passengers and, among feasible vehicles, selects the widest first. Throughout, loading assumes rectangular parallelpipeds--both for vehicles and for aircraft compartments. However, a user requiring a closer approximation to realism could alter the standard method of computing the dimensions of aircraft compartments.

Whenever an aircraft is to be loaded, two lists of vehicles must be considered: the list of vehicles still required for the current priority group and the list of vehicles still available in the stock list to which the aircraft has been assigned. At each step in the loading process the only vehicles to be considered are those appearing on *both* lists. As soon as a vehicle is selected for loading, both the priority group list and the stock list are adjusted accordingly.

The first vehicle loaded into an aircraft is the widest feasible one, that is, it is neither too wide, too long, too high, nor too heavy for the compartment. When selected, the vehicle is placed in the forward left-hand corner of the compartment, as shown in Fig. 17. Next, the unoccupied space to the right of the vehicle (in this case, the area BGJE) is considered. Again, the widest feasible vehicle (taking into account the presence of vehicle 1) is selected and placed in the forward left-hand corner of the available space. The program then moves to the right once more, attempting to load area CHJE. Eventually, no vehicles can be loaded in the space under consideration. At this point the program moves to the rear of the farthest forward vehicle

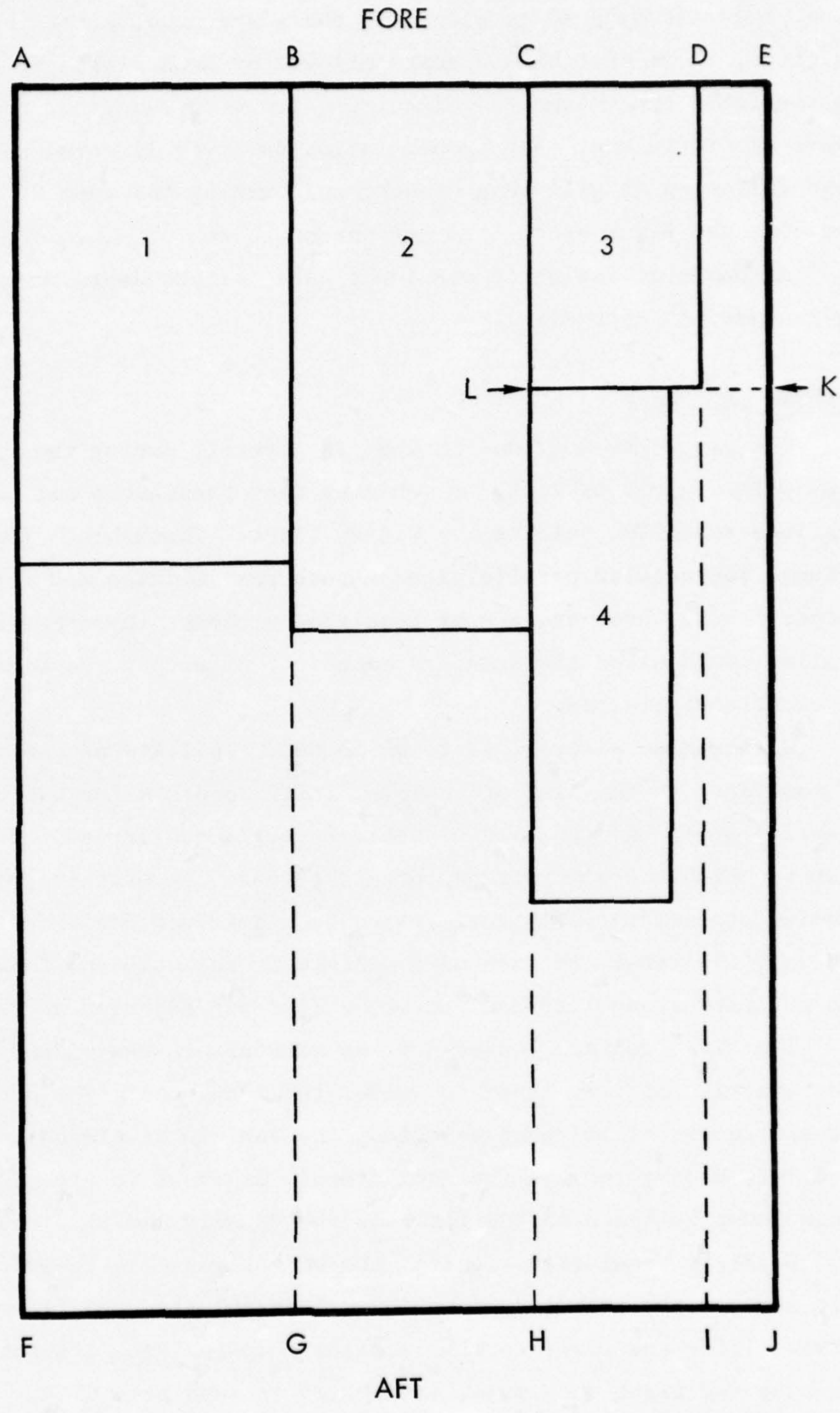


Fig. 17—Vehicle loading

but aft of vehicle 3 and considers the space behind it (LHJK). Loading proceeds in this manner, from front to rear and, along each successive cross section, from left to right, until no further vehicles can be placed in the compartment.

As vehicles are loaded, there will often be space left along one or both side walls of the aircraft compartment. Whenever such space exceeds the width of a passenger (as specified on the first type 01 card), its length along the wall is recorded. After all vehicles have been loaded, the total length of such space is divided by the length of a passenger to estimate the space capacity for passengers. This figure is compared with that obtained by dividing the unused payload capacity by the weight of a passenger. The smaller of the two determines the number of passengers carried.

An exception to this passenger-loading method occurs whenever it is impossible to load any vehicles in an aircraft, either because no vehicles remain in the priority group or the stock list, or because none will fit the compartment. The specification of a 1 cubic inch compartment for an aircraft is one way of insuring that it will be treated as a passenger aircraft. Whenever it is impossible to load any vehicles in an aircraft, the passenger capacity specified on the type 06 card is used, unless payload limitations require a reduction.

If, at loadings other than the initial one, it is impossible to load an aircraft at all (i.e., with either passengers or vehicles), it is not assigned in the manner considered, being allocated instead either to some other stock list or to another priority group.

ALLOCATION OF AIRCRAFT TO BASES AND PRIORITY GROUPS

After all of the aircraft arriving initially have been processed, a record of the time when each aircraft becomes available for redeployment from the offload base remains. The aircraft are rerouted to various onload bases in accordance with the following rules:

1. If *any* eligible onload base has *any* item needed for a priority group, and the aircraft in question can carry it, that aircraft will carry the priority materiel only; it cannot accept loads of two priority levels.

2. If more than one eligible stock list contains items needed for a priority group, and an aircraft can carry them, the list located at the onload base with the greatest flow capacity will be chosen. (The flow capacity of a base is simply the figure calculated for the maximum-flow route from the base to the offload base.)

The first rule indicates the operational meaning of the term priority group; the second suggests that the achievement of a maximum-flow pattern of deliveries within each priority group is pursued in allocating aircraft as well as routing them. For any given priority group, sorties are processed chronologically as aircraft become available at the offload base. All processing (loading and delivering) is done one priority group at a time. When an aircraft is found to be unable to deliver any items for the priority group being processed, it is not redeployed; instead it remains at the offload base, but the time when it was first available is recorded. As soon as processing of the next priority group begins, all passed-over aircraft are re-investigated and deployed as of the time recorded (if they can carry some of the new priority group items).

V. OUTPUTS

The major output of the program is a graph summarizing the results of the deployment simulation. Figure 18 shows such a graph, which is normally read by turning the page 90° counterclockwise. For each time increment from the one preceding the first delivery group through the one in which the last delivery takes place, the graph indicates the cumulative percentage of the requirements delivered; personnel is shown by dots and cargo by asterisks. Each hyphen at the bottom of the graph represents roughly two percent. For greater precision, the data are also printed beside the graph.

Needless to say, the aggregation of as many as 200 different vehicle types into a simple measure based on weight obscures many important details of the deployment. Some meaning, however, may be attached to the graph. If one subscribes to the idea that personnel and equipment must be available in exactly the prescribed ratio to be useful, the better measure of effectiveness would be the lower of the two curves in each time increment.

In addition to the summary graph, certain other information is provided as standard output: routes selected, the composition of the stock lists and priority groups, the number of sorties by aircraft type, etc. In addition to this standard output, eight optional types of information can be obtained by appropriate entries on the parameter card (type 00).

1. *Vehicle data*. This option provides a table containing all the information from the type 01 cards; the dimensions listed *include* the clearance requirements.
2. *Distance table*. This option provides a table giving the shortest allowable nonstop distance for each possible pair of bases. For links not specified on a link data card, the great circle distance will be shown. For others the distance will be the shortest over admissible links.

CUMULATIVE DELIVERIES OF MATERIEL AND PERSONNEL FROM ALL PRIORITY GROUPS TO OFFLOAD BASE

PERSONNEL	PERCENT OF PERSONNEL	PERCENT OF CARGO	DAY	HOUR
2520	5.29	2.16	2	0
12840	26.97	4.79	4	0
22410	47.07	6.79	6	0
30690	64.46	8.29	8	0
33680	70.74	12.96	10	0
42080	88.38	18.71	12	0
45080	94.69	23.25	14	0
47610	100.00	28.15	16	0
47610	100.00	33.72	18	0
47610	100.00	39.27	20	0
47610	100.00	43.03	22	0
47610	100.00	47.07	24	0
47610	100.00	52.46	26	0
47610	100.00	57.40	28	0
47610	100.00	60.49	30	0
47610	100.00	62.08	32	0
47610	100.00	63.76	34	0
47610	100.00	68.30	36	0
47610	100.00	69.00	38	0
47610	100.00	74.51	40	0
47610	100.00	75.64	42	0
47610	100.00	79.19	44	0
47610	100.00	80.55	46	0
47610	100.00	84.09	48	0
47610	100.00	85.79	50	0
47610	100.00	87.03	52	0
47610	100.00	87.91	54	0
47610	100.00	90.32	56	0
47610	100.00	90.70	58	0
47610	100.00	94.40	60	0
47610	100.00	97.09	62	0
47610	100.00	98.64	64	0
47610	100.00	100.00	66	0

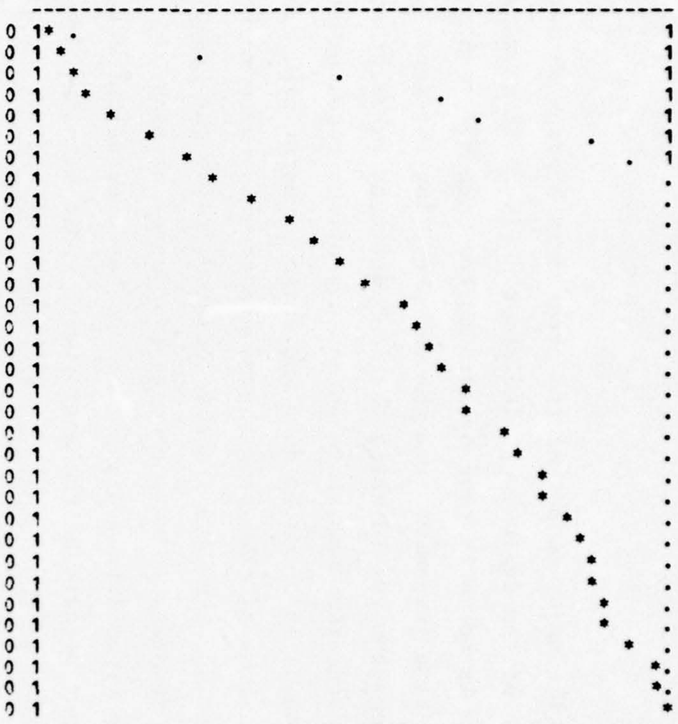


Fig.18—Output summary graph

3. *Priority group composition.* This option provides a listing of each vehicle present in each of the priority groups and the quantity required.
4. *Priority group graphs.* This option provides a cumulative arrival pattern graph for each priority group. The form is similar to that used for the cumulative delivery pattern.
5. *Activity at offload base.* This option provides a record of the arrivals and departures of aircraft at the offload base during each time increment, and the number on the ground at the base at the end of each time period.
6. *Aircraft release times.* This option provides a record of the time when each aircraft in the deployment completed its last sortie (and thus became available at the offload base for use in another operation).
7. *Loads for initial sorties.* This option provides a record of the loads of the initial sorties of each of the aircraft used in the deployment.
8. *Load for each sortie.* This option provides a record of the load carried in each of the sorties flown in a deployment. It permits calculation of average aircraft loads. However, in large deployments where the sorties may run into the thousands, some care must be exercised in using this option.

The full output for the example is shown in Appendix B, which illustrates the form in which the information is presented.

Appendix A

INPUTS

The equipment lists (the 01 cards) are for ten different kinds of army units:

Columns 37-40: Infantry division
Columns 41-44: Armored division
Columns 45-48: Mechanized division
Columns 49-52: Airborne division
Columns 53-56: Airmobile division
Columns 57-60: Infantry and airborne ISI
Columns 61-64: Armored and mechanized ISI
Columns 65-68: Airmobile ISI
Columns 69-72: Unused
Columns 73-76: Independent armored brigade
Columns 77-80: Armored cavalry regiment

The user must bear in mind that the personnel figures given in the 01 card list for this example are 10 percent of the total personnel strength. Therefore, the multiplier 10 must be used as described in Sec. IV in the instructions on the 07 card. Other data for other runs may not require this device.

Another note is necessary. The model permits only 200 different types of equipment to be used. Since between 600 and 700 different equipment line items appear in the units listed above, equipment items of like dimensions and weight are aggregated under one item. As a result, if a reader checks a particular item, he may find that the number shown on the 01 card exceeds allowances for that unit or, in some cases, the line is an invention to encompass a group of items of similar weight and dimensions (YA0001).

The artifice described above does not affect the loading units or the total weights, which are very close to actual operational requirements.

00	ATLANTIC DEPLOYMENT FOR NATO															
00	4	0	0	48	1	1	1	1		1	1	1				
01	MEN	1	30		20	240	1669	1679	1649	1413	1773	1827	1771	1605	421	325
01	K31795	4	113	156	697	6161	37	14	14	88	287	96	28	23	4	5
01	C20414	5	73	66	264	30946	8	18	14					12	4	3
01	P39241	6	117	135	268	36345	4	4	4			12	18	17	1	
01	P39378	7	129	149	577	60800	3	3	3	3	1	39	54	40	1	
01	L43664	8	144	112	340	87700	6	16	12			3		3	4	
01	W76816	9	136	131	233	48960	9	8	7			80	110	78		
01	X48914	10	102	123	269	22960	6	6	6	1		41	82	36		
01	K90188	11	99	129	269	16860	12	62	24							
01	S70243	12	97	121	593	17435	1	1	1			3	5			
01	S70517	13	115	67	416	16285	12	10	10			88	47	46	3	
01	S72024	14	108	98	352	13980	38	37	37	3	1	86	48	98	14	
01	S72983	15	97	109	377	15470	18	30	25			52	161	108	9	
01	S73394	16	128	94	479	45870	2	6	6			4	4	2	2	
01	S74079	17	99	146	347	15850	9	9	9	7		2	2	2		
01	S74490	18	97	134	320	16343	9	10	9	8	4	11	6	5		
01	X40009	19	96	81	265	15180	453	473	437	122	90	697	691	624	91	82
01	X40146	20	96	81	279	15570	392	247	238	70	29	271	259	68	50	
01	X40283	21	96	81	329	14876	4	4	4	1	1	6	6	6		
01	X40831	22	98	86	304	20910	42	179	159			32	35	26	48	40
01	X40968	23	115	87	320	21771	93	161	155			4	8	6	37	
01	X43845	24	98	91	289	23847	45	22	22			57	24	52	4	
01	X59326	25	98	86	264	19387	80	93	85	18	1	308	310	367	27	
01	X59463	26	102	86	280	20107	1	1	1			1	1	5		
01	X59600	27	115	111	288	30612	2	6	6				2	6	2	
01	X59874	28	115	111	290	30082	12	10	10			37	51	35	3	
01	X60696	29	117	99	360	33874	1	1	1			6	7	9		
01	X62340	30	100	130	265	15760	79	72	74	2		35	31	38	16	3
01	X62477	31	100	130	279	16102	8	8	8			7	7	4		
01	X63299	32	99	106	355	34820	46	41	48			38	44	36	4	10
01	K27486	33	98	98	391	26560	8	8	8							
01	L45534	34	120	148	513	42680	4	4	4							
01	A93125	35	111	98	249	29960	27	27	27			30	6	27		
01	E56577	36	147	130	354	110560	3	8	8						2	
01	J96694	37	106	105	192	24200	24	24	24							
01	K56981	38	124	108	265	57630	4	12	12				12	12		
01	K57666	39	125	110	355	49048	54	54	54				18	18		18
01	R50544	40	124	115	254	48448	18	13	61			6	4	9	7	15
01	R50681	41	135	118	321	107600	10	37	27			6	5	4	11	3
01	V13101	42	144	129	325	97000	54	324	216			17		17	117	
01	T10275	43	97	129	322	20000	1	1	3			4	9	8		
01	T13152	44	96	113	335	32780	1	1	1	1		7	5	5		
01	P43077	46	102	89	203	15470				3	1	3		9		
01	J74920	47	91	90	309	20940				4		9	9	9		
01	X63162	48	96	101	303	23960				11	3		1	1		
01	S12575	50	120	54	162	6540					2	24	24	28		
01	W76268	51	86	84	155	20290					4	96	96	96		
01	J35698	53	97	118	313	26430			2			4	8	7		
01	K30378	54	142	141	611	17660					96	129	66	4		
01	D12087	55	100	84	192	20125	89	358	397			43		34	79	26

C1	D11401	56	75	91	168	13503	74	179	179			67	7	50		42	51
C1	D11538	57	101	104	192	22415	22	138	129			15		25		29	10
C1	E02670	58	97	51	188	2720	4	6	4	8		24	20	29			
C1	W94030	59	95	58	148	2750	102	105	105	6		17	29	7		42	
C1	W95263	61	89	51	150	1640	2	2	2			18	18	3			
C1	W95537	63	74	50	147	1350	549	323	330	505	351	210	261	208		80	
C1	W95811	64	83	55	166	2670	638	659	632	79	76	647	567	519		140	
C1	W98825	65	82	81	162	2530	120	116	119	79	26	164	198	103		25	
C1	X38639	66	66	53	142	2895	58	37	34	1		4	4	4		11	3
C1	X38776	67	83	91	200	6900	42	41	41	484	259	46	38	43		21	1
C1	X39735	68	76	65	186	5660	687	469	466	484	259	273	624	332		85	62
C1	X39672	69	76	65	191	5836	93	191	125	192	147	55	50	40		31	
C1	X57271	70	96	92	264	14600	21	20	18	2		33	37	30		5	
C1	X57408	71	96	92	278	15022	2	2	2			14	15	15			21
C1	X59052	72	94	82	229	11703	2	2	2			11	17	19			
C1	X53189	73	94	82	243	12143	1	1	1							1	
C1	X60833	74	64	53	132	2450	1061	905	914	818	670	573	772	237		222	112
C1	K57529	76	97	70	284	4760	54										
C1	V12826	82	126	109	277	46580											51
C1	V12963	83	143	117	292	99500											51
C1	B12482	85	42	42	225	4540						1	1	1			
C1	B18373	87	97	66	196	7510						7	16	10			
C1	B63711	90	118	44	154	9110						1	1	3			
C1	C30997	108	46	54	73	1675						58	155	11			
C1	K29660	111	128	150	626	7475	15	9	9								
C1	D11049	113	100	77	232	16774							42	48			
C1	E02533	117	98	47	188	3675					58	18	18	18			
C1	E40960	118	84	90	166	4905						17	33	49	3		
C1	E59626	119	84	84	145	18280						2	2	2			
C1	E59631	120	81	86	122	9385						4	4	4			
C1	E73352	122	78	67	163	10660						2	1	6			
C1	E84531	123	68	64	105	3260						26	37	14			
C1	F06424	124	120	111	434	9800						4	4	4			
C1	F40474	125	136	153	222	84330								4			
C1	F43364	126	124	122	182	42630						4	4	4			
C1	F43414	127	44	34	196	3356						14	16	14			
C1	F43429	128	100	118	459	65880								1			
C1	F50721	129	108	144	410	72030						1	1	1			
C1	F51132	131	118	143	495	61450						1	1	1			
C1	G27844	134	100	122	340	24760						2	2	3			
C1	G28212	135	99	110	290	21300						6	6	7			
C1	G29945	136	99	126	355	37100						2	2	3			
C1	G40261	138	98	115	198	12820						1	1	2			
C1	G55186	139	95	115	199	7370						3	1	3			
C1	H01855	140	99	131	394	18080						9	15	13	2		
C1	H01857	141	99	131	327	21390						6	10	10			
C1	J30766	144	102	134	417	29630						1		3			
C1	J31451	145	100	139	261	57304						2		6			
C1	J42100	151	83	68	178	4680					54	81	27	47			
C1	J74852	153	95	124	313	28250						13	17	13			
C1	J97230	155	124	108	443	59200						12	12	12			
C1	K04697	156	25	24	137	7000						4	4	5			
01	K25215	160	88	104	169	8530								2			
C1	K57667	163	125	110	355	49048						6		12			
C1	L21437	164	68	56	144	1830						4	5	1			
C1	L45808	165	96	92	117	4265						24	24	24			
01	L48315	166	98	96	196	8930						24	22	22			
01	M54151	170	96	130	110	7250					2	10	8	10			
01	M55384	171	96	98	293	15860						1	1	1			
C1	N75124	172	134	89	200	23058								2			
C1	P11866	176	97	76	214	8910				2		16	21	16			

01	Q17606	178	98	92	192	4490			3	12	17	4
01	Q17880	179	98	127	192	9230			6	8	8	8
01	S03225	183	98	75	199	13150				1	1	
01	S11273	186	77	103	276	27410						
01	S11616	187	77	81	225	21340				3	3	
01	S12164	188	88	47	139	3360				7	8	1
01	S12438	190	96	92	295	14710				2	2	
01	S56256	191	124	107	370	31390				12	12	
01	S56941	192	100	82	290	12675	18			9	9	18
01	S70661	196	120	109	515	31679						
01	S71613	197	98	132	284	8330				98	19	
01	S72846	198	98	107	374	12470				60	60	
01	S73120	199	95	95	248	6424				2	2	
01	S73531	200	98	134	276	7570				6	12	
01	S74216	201	99	133	325	8820					4	
01	S74353	202	99	133	373	13250				1	1	
01	S74832	203	95	132	316	16580				8	20	
01	S75038	204	96	129	276	7180				26	27	
01	S75175	205	98	142	346	15110				34	57	
01	T10138	206	85	82	172	5680				29	33	
01	T10412	207	96	130	322	17495					1	
01	T10549	208	98	129	349	29920				4	5	
01	T21235	210	97	124	321	20420				3	8	
01	T30414	212	98	130	265	17300				6	6	
01	T40634	213	36	27	234	3320				2	4	
01	T40771	214	68	42	314	10350						
01	U59579	217	67	55	268	17230				1	1	
01	V08844	219	98	135	346	25060				1	1	1
01	V57092	223	62	68	108	1500			290		11	4
01	V57594	224	87	83	173	5200				43	64	72
01	W00769	225	100	108	250	17500				1	1	1
01	W89557	231	67	58	122	6800		4	2	29	21	29
01	W90790	232	124	123	302	48700				42	42	42
01	W90927	233	100	81	201	16000				8	8	8
01	W94536	234	94	45	213	4860				57	75	72
01	W96907	235	98	55	333	11280				9	11	14
01	X38951	236	84	65	226	7480				67	29	143
01	X39833	238	86	60	211	6007				19	15	9
01	X40931	242	99	86	315	20912				4	7	3
01	X41105	243	98	89	378	24037						20
01	X41242	244	98	89	396	25600						24
01	X41310	245	96	83	279	16778				44	9	48
01	X41327	246	96	83	299	18328				9		9
01	X41615	247	109	99	382	24339				37	26	37
01	X43297	249	96	83	261	15213			15	20	20	19
01	X43434	250	96	83	273	15770		27		2	4	2
01	X43708	251	98	91	274	22615				165	196	177
01	X48914	252	102	95	189	23848				41		36
01	X49051	253	107	98	107	33600		3	1	10	11	12
01	X51585	254	59	68	94	8220			1	7	14	7
01	X51791	255	73	115	115	1480				20	26	21
01	X51928	256	89	93	188	17040				8	18	13
01	X52476	257	106	104	232	27920				10	18	12
01	X53903	258	88	83	307	16830				3	3	3
01	X58078	259	109	101	392	27345				6	4	4
01	X62237	261	99	138	361	27577				1	5	7
01	X63436	262	109	118	401	39798				9	8	10
01	YA0001	264	97	134	321	19410				23	28	3
01	YA0002	265	96	100	167	4120		5		1	1	1
01	YA0005	266	100	128	281-	19480				7	12	7
01	YA0006	267	98	127	345	23420				1	1	2

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01  YA0025  269   96  100  169  3800                          37   10   53  113
01  YA0035  272   97  134  321 21020                                      1    1
01  Z90492  276  100   55  280 10000                                     12   12
01  F39172  471  108  105  218 21200                          11    2     2
01  J36109  486   34   56   99  2940                      2    1   14    25   48
01  J37205  488   96   85  171  7233                                6    16    8
01  J37342  489   37   59   88  4820                               45    44
01  J46252  494   77   77  147  2100                              114   153  119
01  J47480  499   84   65  176  3790                               29    97
01  L33810  510   98  122  317 14740                                      1
01  L36739  512  253  177  884131734                               19    19
01  L67234  515  124   99  425 21520                              350   350
01  L76556  517  102  105  302 24400                           2   39    64   52
01  L76752  519   74   84  148  5400                               12    12
01  R65133  552   52   39  158  7888                                4     2
01  S70136  556   97   73  418 14260                                1     1
01  T10136  558   86   81  224  7325                                2     4
01  T11732  559   85   82  190  5300                               30    96   19
01  U58875  581  145   99  285 19500                               12    24
01  U58878  582  360   27  359 14000                               24    48
01  U58881  583  144  115  510 31905                               36    72
01  X23227  608   70   48  102  1000                     108  19   47    75    6      18
01  X41653  614  109   93  382 25079                                     18   18
01  X53846  620   95  112  275 16300                                3     3
01  X60694  621  115  111  290 30082                                      4

02  1     1

03  BIGGS     11     0      31 51    -106 23
03  CAMPBL    12     0      36 40     -87 29
03  HOOD      13     0      31 04     -97 50
03  DOVER     14     0      39 08     -75 28
03  GOOSE     15     0      53 19     -60 26
03  HICKAM    16     0      21 20    -157 55
03  FRANKF    17     0      50 02       8 34

04       16    17

05       17    11    12    13    16

06     C-5A    50   228   162 1453    73   428 3350 5750 6900   215400   105000     2.0
06   C-141A   141   123   109  840   120   422 3920 5750 6350    67600    30000     2.0
06   C-141C   142     1     1    1   120   432 3920 5750 6120    57200    19600     2.0 1
06       14

07        1    12     1     4    -1
07        2    12    10     4    +1
07        3    16     1     1    -1
07        4    16    10     1    +1
07        5    13     1     2    -1
07        6    13    10     2    +1
07        7    11     1    11    -1

08     1 2                        1      4    -1
08     1 2                       10      4    +1

09       12     1     1   50     30      0   .5
09       12     1     2  141    100     10   .5
09       12     2     2  142    100     10   .5

10     3 4 5 6                    1      1    -1
```

```
10     3 4 5 6              10     1    +1
10     3 4 5 6               1     2    -1
10     3 4 5 6              10     2    +1

10     7 7                   1    11    -1

11
/*
```

Appendix B

OUTPUTS

0 ATLANTIC DEPLOYMENT FCh NATC

CLEARANCE REQUIREMENTS -- WIDTH - 4.0 HEIGH1 - 0.0 LENGTH - 0.0

VEHICLE DATA

NAME	NUMBEF	WIDTH	HEIGHT	LENGTH	WEIGHT	UN. 1	UN. 2	UN. 3	UN. 4	UN. 5	UN. 6	UN. 7	UN. 8	UN. 9	UN.10	UN.11
MEN	1	30.0	0.0	20.0	240.0	1669	1679	1649	1413	1773	1000	1000	1000	1000	1000	325
K31795	4	117.0	156.0	697.0	6161.0	37	14	14	88	287	96	28	23	0	4	5
C20414	5	77.0	66.0	264.0	30946.0	8	18	14	0	0	0	0	12	0	4	3
F39241	6	121.0	135.0	268.0	36345.0	4	4	4	0	0	12	18	17	0	1	0
F39378	7	133.0	149.0	577.0	60800.0	3	3	3	3	1	39	54	40	0	1	0
I43664	8	148.0	112.0	340.0	67700.0	6	16	12	0	0	3	0	3	0	4	0
W76816	9	140.0	131.0	233.0	48960.0	9	8	7	0	0	80	110	78	0	0	0
X48914	10	106.0	123.0	269.0	22960.0	6	6	6	1	0	41	82	36	0	0	0
K90188	11	103.0	129.0	269.0	16860.0	12	62	24	0	0	0	0	0	0	0	0
S70243	12	101.0	121.0	593.0	17435.0	1	1	1	0	0	3	5	0	0	0	0
S70517	13	119.0	67.0	416.0	16265.0	12	10	10	0	0	88	47	46	0	3	0
S72024	14	112.0	98.0	352.0	13980.0	38	37	37	3	1	86	48	98	2	14	0
S72983	15	101.0	109.0	377.0	15470.0	18	30	25	0	0	52	161	108	0	9	0
S73394	16	132.0	94.0	479.0	45870.0	2	6	6	0	0	4	4	2	0	2	0
S74079	17	103.0	146.0	347.0	15850.0	9	9	9	7	0	2	2	2	0	0	0
S74490	18	101.0	134.0	320.0	16343.0	9	10	9	8	4	11	6	5	0	0	0
X40009	19	100.0	81.0	265.0	15180.0	453	473	437	122	90	697	691	624	9	91	82
X40146	20	100.0	81.0	279.0	15570.0	392	247	238	70	29	271	259	68	0	50	0
X40283	21	100.0	81.0	329.0	14876.0	4	4	4	1	1	6	6	6	0	0	0
X40831	22	102.0	86.0	304.0	20910.0	42	179	159	0	0	32	35	26	0	48	40
X40968	23	119.0	87.0	320.0	21771.0	93	161	155	0	0	4	8	6	0	37	0
X43845	24	102.0	91.0	289.0	23847.0	45	22	22	0	0	57	24	52	0	4	0
X59326	25	102.0	86.0	264.0	19387.0	80	93	85	18	1	308	310	367	0	27	0
X59463	26	106.0	86.0	280.0	20107.0	1	1	1	0	0	1	1	5	0	0	0
X59600	27	119.0	111.0	288.0	30612.0	2	6	6	0	0	0	2	6	0	2	0
X59874	28	119.0	111.0	290.0	30082.0	12	10	10	0	0	37	51	35	0	3	0
X60696	29	121.0	99.0	360.0	33874.0	1	1	1	0	0	6	7	9	0	0	0
X62340	30	104.0	130.0	265.0	15760.0	79	72	74	2	0	35	31	38	0	16	3
X62477	31	104.0	130.0	279.0	16102.0	8	8	8	0	0	7	7	4	0	0	0
X63299	32	103.0	106.0	355.0	34620.0	46	41	48	0	0	38	44	36	0	4	10
K27486	33	102.0	98.0	391.0	26560.0	8	8	8	0	0	0	0	0	0	0	0
I45534	34	124.0	148.0	513.0	42680.0	4	4	4	0	0	0	0	0	0	0	0
A93125	35	115.0	98.0	249.0	29960.0	27	27	27	0	0	30	6	27	0	0	0
E56577	36	151.0	130.0	354.0	110560.0	3	8	8	0	0	0	0	0	0	2	0
J96694	37	110.0	105.0	192.0	24200.0	24	24	24	0	0	0	0	0	0	0	0
K56981	38	128.0	108.0	265.0	57630.0	4	12	12	0	0	0	12	12	0	0	0
K57666	39	129.0	110.0	355.0	49048.0	54	54	54	0	0	0	18	18	0	0	18
F50544	40	128.0	115.0	254.0	48448.0	18	13	61	0	0	6	4	9	0	7	15
F50681	41	139.0	116.0	321.0	107600.0	10	37	27	0	0	6	5	4	0	11	3
V13101	42	148.0	129.0	325.0	97000.0	54	324	216	0	0	17	0	17	0	117	0
Z10275	43	101.0	129.0	322.0	20000.0	1	1	3	0	0	4	9	8	0	0	0
T13152	44	100.0	119.0	335.0	32780.0	1	1	1	1	0	7	5	5	0	0	0
F43077	46	106.0	89.0	203.0	15470.0	0	0	0	3	1	3	0	9	0	0	0
J74920	47	95.0	90.0	309.0	20940.0	0	0	0	4	0	9	9	9	0	0	0
X63162	48	100.0	101.0	303.0	23960.0	0	0	0	11	3	0	1	1	0	0	0
S12575	50	124.0	54.0	162.0	6540.0	0	0	0	0	2	24	24	28	0	0	0
W76268	51	90.0	84.0	155.0	20290.0	0	0	0	0	4	96	96	96	0	0	0
J35698	53	101.0	118.0	313.0	26430.0	0	0	2	0	0	4	8	7	0	0	0
K30378	54	146.0	141.0	611.0	17660.0	0	0	0	0	96	129	66	4	0	0	0
D12087	55	104.0	84.0	192.0	20125.0	89	358	397	0	0	43	0	34	0	79	26
D11401	56	79.0	91.0	168.0	13503.0	74	179	179	0	0	67	7	50	0	42	51
D11538	57	105.0	104.0	192.0	22415.0	22	138	129	0	0	15	0	25	0	29	10

E02670	58	101.0	51.0	188.0	2720.0	4	6	4	8	0	24	20	29	0	0	0
W94030	59	99.0	58.0	148.0	2750.0	102	105	105	6	0	17	29	7	0	42	0
W95263	61	93.0	51.0	150.0	1640.0	2	2	2	0	0	18	18	3	0	0	0
W95537	63	78.0	50.0	147.0	1350.0	549	323	330	505	351	210	261	208	0	80	0
W95811	64	87.0	55.0	166.0	2670.0	638	659	632	79	76	647	567	519	0	140	0
W98825	65	86.0	81.0	162.0	2530.0	120	116	119	79	26	164	198	103	0	25	0
X38639	66	70.0	53.0	142.0	2895.0	58	37	34	1	0	4	4	4	0	11	3
X38776	67	87.0	91.0	200.0	6900.0	42	41	41	484	259	46	38	43	0	21	1
X39735	68	80.0	65.0	186.0	5660.0	687	469	466	484	259	273	624	332	0	85	62
X39872	69	80.0	65.0	191.0	5836.0	93	191	125	192	147	55	50	40	0	31	0
X57271	70	100.0	92.0	264.0	14600.0	21	20	18	2	0	33	37	30	0	5	0
X57408	71	100.0	92.0	278.0	15022.0	2	2	2	0	0	14	15	15	0	0	21
X59052	72	98.0	82.0	229.0	11703.0	2	2	2	0	0	11	17	19	0	0	0
X59189	73	98.0	82.0	243.0	12143.0	1	1	1	0	0	0	0	0	0	1	0
X60833	74	68.0	53.0	132.0	2450.0	1061	905	914	818	670	573	772	237	0	222	112
K57529	76	91.0	70.0	284.0	4760.0	54	0	0	0	0	0	0	0	0	0	0
V12826	82	130.0	109.0	277.0	46580.0	0	0	0	0	0	0	0	0	0	0	51
V12963	83	147.0	117.0	292.0	99500.0	0	0	0	0	0	0	0	0	0	0	51
E12482	85	46.0	42.0	225.0	4540.0	0	0	0	0	0	1	1	1	0	0	0
E18373	87	101.0	86.0	196.0	7510.0	0	0	0	0	0	7	16	10	0	0	0
E63711	90	122.0	44.0	154.0	9110.0	0	0	0	0	0	1	1	3	0	0	0
C30997	108	50.0	54.0	73.0	1675.0	0	0	0	0	0	58	155	11	0	0	0
K29660	111	132.0	150.0	626.0	7475.0	15	9	9	0	0	0	0	0	0	0	0
D11049	113	104.0	77.0	232.0	16774.0	0	0	0	0	0	0	42	48	0	0	0
E02533	117	102.0	47.0	188.0	3675.0	0	0	0	0	58	18	18	18	0	0	0
E40960	118	88.0	90.0	166.0	4905.0	0	0	0	0	0	17	33	49	3	0	0
E59626	119	88.0	84.0	145.0	18280.0	0	0	0	0	0	2	2	2	0	0	0
E59831	120	85.0	86.0	122.0	9385.0	0	0	0	0	0	4	4	4	0	0	0
E73352	122	82.0	87.0	163.0	10660.0	0	0	0	0	0	2	1	6	0	0	0
E84531	123	72.0	64.0	105.0	3260.0	0	0	0	0	0	26	37	14	0	0	0
F06424	124	124.0	111.0	434.0	9800.0	0	0	0	0	0	4	4	4	0	0	0
F40474	125	140.0	153.0	222.0	84330.0	0	0	0	0	0	0	0	4	0	0	0
F43364	126	128.0	122.0	182.0	42630.0	0	0	0	0	0	4	4	4	0	0	0
F43414	127	48.0	34.0	198.0	3356.0	0	0	0	0	0	14	16	14	0	0	0
F43429	128	104.0	118.0	459.0	65880.0	0	0	0	0	0	0	0	1	0	0	0
F50721	129	112.0	144.0	410.0	72030.0	0	0	0	0	0	1	1	1	0	0	0
F51132	131	122.0	143.0	495.0	61450.0	0	0	0	0	0	1	1	1	0	0	0
G27844	134	104.0	122.0	340.0	24760.0	0	0	0	0	0	2	2	3	0	0	0
G28212	135	103.0	110.0	290.0	21300.0	0	0	0	0	0	6	6	7	0	0	0
G29945	136	103.0	126.0	355.0	37100.0	0	0	0	0	0	2	2	3	0	0	0
G40261	138	102.0	115.0	198.0	12820.0	0	0	0	0	0	1	1	2	0	0	0
G55186	139	99.0	115.0	199.0	7370.0	0	0	0	0	0	3	1	3	0	0	0
H01855	140	103.0	131.0	394.0	18080.0	0	0	0	0	0	9	15	13	2	0	0
H01857	141	103.0	131.0	327.0	21390.0	0	0	0	0	0	6	10	10	0	0	0
J30766	144	106.0	134.0	417.0	29630.0	0	0	0	0	0	1	0	3	0	0	0
J31451	145	104.0	139.0	261.0	57304.0	0	0	0	0	0	2	0	6	0	0	0
J42100	151	87.0	68.0	176.0	4680.0	0	0	0	0	54	81	27	47	0	0	0
J74852	153	99.0	124.0	313.0	28250.0	0	0	0	0	0	13	17	13	0	0	0
J97230	155	128.0	108.0	443.0	59200.0	0	0	0	0	0	12	12	12	0	0	0
K04697	156	29.0	24.0	137.0	7000.0	0	0	0	0	0	4	4	5	0	0	0
K25215	160	92.0	104.0	169.0	8530.0	0	0	0	0	0	0	0	2	0	0	0
K57667	163	129.0	110.0	355.0	49048.0	0	0	0	0	0	6	0	12	0	0	0
I21437	164	72.0	56.0	144.0	1830.0	0	0	0	0	0	4	5	1	0	0	0
I45808	165	100.0	92.0	117.0	4265.0	0	0	0	0	0	24	24	24	0	0	0
I48315	166	102.0	96.0	196.0	8930.0	0	0	0	0	0	24	22	22	0	0	0
M54151	170	100.0	130.0	110.0	7250.0	0	0	0	0	2	10	8	10	0	0	0
M55384	171	100.0	98.0	293.0	15860.0	0	0	0	0	0	1	1	1	0	0	0
N75124	172	138.0	89.0	200.0	23058.0	0	0	0	0	0	0	0	2	0	0	0
E11866	176	101.0	76.0	214.0	8910.0	0	0	0	2	0	16	21	16	0	0	0
C17606	178	102.0	92.0	192.0	4490.0	0	0	0	0	3	12	17	4	0	0	0
C17880	179	102.0	127.0	192.0	9230.0	0	0	0	0	6	8	8	8	0	0	0

S03225	183	102.0	75.0	199.0	13150.0	0	0	0	0	0	1	1	0	9	0	0
S11273	186	81.0	103.0	276.0	27410.0	0	0	0	0	0	0	0	0	1	0	0
S11616	187	81.0	81.0	225.0	21340.0	0	0	0	0	0	3	3	0	3	0	0
S12164	188	92.0	47.0	139.0	3360.0	0	0	0	0	0	7	8	1	8	0	0
S12438	190	100.0	92.0	295.0	14710.0	0	0	0	0	0	2	2	0	2	0	0
S56256	191	128.0	107.0	370.0	31390.0	0	0	0	0	0	12	12	0	12	0	0
S56941	192	104.0	82.0	290.0	12675.0	18	0	0	0	0	9	9	18	9	0	0
S70661	196	124.0	108.0	515.0	31679.0	0	0	0	0	0	0	0	0	4	0	0
S71613	197	102.0	132.0	284.0	8330.0	0	0	0	0	0	98	19	0	19	0	0
S72846	198	102.0	107.0	374.0	12470.0	0	0	0	0	0	60	60	0	121	0	0
S73120	199	99.0	95.0	248.0	6424.0	0	0	0	0	0	2	2	0	1	0	0
S73531	200	102.0	134.0	276.0	7570.0	0	0	0	0	0	6	12	0	12	0	0
S74216	201	103.0	138.0	325.0	8820.0	0	0	0	0	0	0	4	0	4	0	0
S74353	202	103.0	133.0	373.0	13050.0	0	0	0	0	0	1	1	0	1	0	0
S74832	203	99.0	132.0	316.0	16580.0	0	0	0	0	0	8	20	0	18	0	0
S75038	204	100.0	129.0	276.0	7180.0	0	0	0	0	0	26	27	0	15	0	0
S75175	205	102.0	142.0	346.0	15110.0	0	0	0	0	0	34	57	0	41	0	0
T10138	206	89.0	82.0	172.0	5680.0	0	0	0	0	0	29	33	0	29	0	0
T10412	207	100.0	130.0	322.0	17495.0	0	0	0	0	0	0	1	0	1	0	0
T10549	208	102.0	129.0	349.0	29920.0	0	0	0	0	0	4	5	0	3	0	0
T21235	210	101.0	134.0	321.0	20420.0	0	0	0	0	0	3	8	0	24	0	0
T30414	212	102.0	130.0	265.0	17300.0	0	0	0	0	0	6	6	0	7	0	0
T40634	213	40.0	27.0	234.0	3320.0	0	0	0	0	0	2	4	0	2	0	0
T40771	214	72.0	42.0	314.0	10350.0	0	0	0	0	0	0	0	0	9	0	0
U59579	217	71.0	55.0	268.0	17230.0	0	0	0	0	0	1	1	0	1	0	0
V08844	219	102.0	136.0	346.0	25060.0	0	0	0	0	0	1	1	1	0	0	0
V57092	223	66.0	68.0	108.0	1500.0	0	0	0	0	290	0	11	4	0	0	0
V57504	224	91.0	83.0	173.0	5200.0	0	0	0	0	0	43	64	72	0	0	0
W00769	225	104.0	108.0	250.0	17500.0	0	0	0	0	0	1	1	1	0	0	0
W89557	231	71.0	58.0	122.0	6800.0	0	0	0	4	2	29	21	29	0	0	0
W90790	232	128.0	123.0	302.0	48700.0	0	0	0	0	0	42	42	42	0	0	0
W90927	233	104.0	81.0	201.0	16000.0	0	0	0	0	0	8	8	8	0	0	0
W94536	234	98.0	45.0	213.0	4860.0	0	0	0	0	0	57	75	72	0	0	0
W96907	235	102.0	55.0	333.0	11280.0	0	0	0	0	0	9	11	14	0	0	0
X38961	236	88.0	65.0	226.0	7480.0	0	0	0	0	0	67	29	143	0	0	0
X39883	238	90.0	60.0	211.0	6007.0	0	0	0	0	0	19	15	8	0	0	0
X40931	242	103.0	86.0	315.0	20912.0	0	0	0	0	0	4	7	3	0	0	0
X41105	243	102.0	89.0	378.0	24037.0	0	0	0	0	0	0	0	20	0	0	0
X41242	244	102.0	89.0	396.0	25609.0	0	0	0	0	0	0	0	24	0	0	0
X41310	245	100.0	83.0	279.0	16778.0	0	0	0	0	0	44	9	48	0	0	0
X41327	246	100.0	83.0	299.0	18328.0	0	0	0	0	0	9	0	9	0	0	0
X41615	247	113.0	99.0	382.0	24339.0	0	0	0	0	0	37	26	37	0	0	0
X43297	249	100.0	83.0	261.0	15213.0	0	0	0	0	15	20	20	19	0	0	0
X43434	250	100.0	83.0	273.0	15770.0	0	0	0	27	0	2	4	2	0	0	0
X43708	251	102.0	91.0	274.0	22615.0	0	0	0	0	0	165	196	177	0	0	0
X48914	252	106.0	95.0	189.0	23848.0	0	0	0	0	0	41	0	36	0	0	0
X49051	253	111.0	98.0	107.0	33600.0	0	0	0	3	1	10	11	12	0	0	0
X51585	254	63.0	68.0	94.0	8220.0	0	0	0	0	1	7	14	7	0	0	0
X51791	255	77.0	115.0	115.0	1480.0	0	0	0	0	0	20	26	21	0	0	0
X51928	256	93.0	93.0	188.0	17040.0	0	0	0	0	0	8	18	13	0	0	0
X52476	257	110.0	104.0	232.0	27920.0	0	0	0	0	0	10	18	12	0	0	0
X53983	258	92.0	83.0	307.0	16830.0	0	0	0	0	0	3	3	3	0	0	0
X58078	259	113.0	101.0	392.0	27345.0	0	0	0	0	0	6	4	4	0	0	0
X62237	261	103.0	138.0	361.0	27577.0	0	0	0	0	0	1	5	7	0	0	0
X63436	262	113.0	118.0	401.0	39798.0	0	0	0	0	0	9	8	10	0	0	0
YA0001	264	101.0	134.0	321.0	19410.0	0	0	0	0	0	23	28	3	0	0	0
YA0002	265	100.0	100.0	167.0	4120.0	0	0	0	5	0	1	1	1	0	0	0
YA0005	266	104.0	128.0	281.0	19480.0	0	0	0	0	0	7	12	7	0	0	0
YA0006	267	102.0	127.0	345.0	23420.0	0	0	0	0	0	1	1	2	0	0	0
YA0025	269	100.0	100.0	169.0	3800.0	0	0	0	0	37	10	53	113	0	0	0
YA0035	272	101.0	134.0	321.0	21020.0	0	0	0	0	0	0	1	1	0	0	0

Z90492	276	104.0	55.0	280.0	10000.0	0	0	0	0	0	0	12	12	0	0	0
F39172	471	112.0	105.0	218.0	21200.0	0	0	0	0	11	2	2	0	0	0	0
J36109	466	38.0	56.0	99.0	2940.0	0	0	0	2	1	14	25	48	0	0	0
J37205	488	100.0	85.0	171.0	7233.0	0	0	0	0	0	6	16	8	0	0	0
J37342	489	41.0	59.0	88.0	4820.0	0	0	0	0	0	45	44	0	0	0	0
J46252	494	81.0	77.0	147.0	2100.0	0	0	0	0	0	114	153	119	0	0	0
J47480	499	88.0	65.0	176.0	3790.0	0	0	0	0	0	29	97	0	0	0	0
I33800	510	102.0	122.0	317.0	14740.0	0	0	0	0	0	0	1	0	0	0	0
I36739	512	257.0	177.0	884.0	131734.0	0	0	0	0	0	19	19	0	0	0	0
I67234	515	128.0	99.0	425.0	21520.0	0	0	0	0	0	350	350	0	0	0	0
I76556	517	106.0	105.0	300.0	24400.0	0	0	0	0	2	39	64	52	0	0	0
I76762	519	78.0	84.0	148.0	5400.0	0	0	0	0	0	12	12	0	0	0	0
F65133	552	54.0	39.0	158.0	7888.0	0	0	0	0	0	4	2	0	0	0	0
S70106	556	101.0	73.0	418.0	14260.0	0	0	0	0	0	1	1	0	0	0	0
T10136	558	90.0	81.0	224.0	7325.0	0	0	0	0	0	2	4	0	0	0	0
T11782	559	89.0	82.0	190.0	5300.0	0	0	0	0	0	30	96	19	13	0	0
U58875	581	149.0	99.0	285.0	19500.0	0	0	0	0	0	12	24	0	0	0	0
U58878	582	364.0	27.0	359.0	14000.0	0	0	0	0	0	24	48	0	0	0	0
U58881	583	148.0	115.0	510.0	31905.0	0	0	0	0	0	36	72	0	0	0	0
X23227	608	74.0	48.0	102.0	1000.0	0	0	0	108	19	47	75	6	0	180	0
X41653	614	113.0	99.0	382.0	25079.0	0	0	0	0	0	0	18	18	0	0	0
X53846	620	99.0	112.0	275.0	16300.0	0	0	0	0	0	3	3	0	0	0	0
X60694	621	119.0	111.0	290.0	30082.0	0	0	0	0	0	0	4	0	0	0	0

VEHICLE LIST 1 INCLUDES THE FOLLOWING VEHICLES
1

BASES USED IN DEPLOYMENT

NAME	NUMBER	GROUND TIME	DEG LAT	MIN LAT	DEG LONG	MIN LONG
BIGGS*	11	0.0	31.	51.	-106.	23.
CAMPBL	12	0.0	36.	40.	-87.	29.
HOOD	13	0.0	31.	4.	-97.	50.
DOVER	14	0.0	39.	8.	-75.	28.
GOOSE	15	0.0	53.	19.	-60.	26.
HICKAM	16	0.0	21.	20.	-157.	55.
FRANKF	17	0.0	50.	2.	8.	34.

*This is the air force base used as the aerial embarkation point for FORT BLISS indicated as the onload base on page 2 and Figure 1.

LINKS INPUT

FROM	TO	DISTANCE
HICKAM	FRANKF	LINK DENIED

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TABLE OF SHORTEST ALLOWABLE DISTANCES

DISTANCES FROM BIGGS
 CAMPBL   978.   HOOD     440.   DOVER   1562.   GOOSE   2344.   HICKAM  2807.   FRANKF  4793.

DISTANCES FROM CAMPBL
 HOOD     614.   DOVER    587.   GOOSE   1504.   HICKAM  3724.   FRANKF  3968.

DISTANCES FROM HOOD
 DOVER   1194.   GOOSE   2091.   HICKAM  3245.   FRANKF  4561.

DISTANCES FROM DOVER
 GOOSE   1050.   HICKAM  4259.   FRANKF  3454.

DISTANCES FROM GOOSE
 HICKAM  4635.   FRANKF  2471.

DISTANCES FROM HICKAM
 FRANKF  7106.
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ROUTES FOR   C-5A AIRCRAFT
     COMPARTMENT IS    228.0 WIDE,    162.0 HIGH AND    1453.0 LONG (   73. PASSENGERS)
     MAXIMUM PAYLOAD IS   215400.0 REDUCED PAYLOAD IS   105000.0 RANGES ARE    3350.0    5750.0    6900.0
     SPEED IS     428.  GTPFH=       2.00

MINIMUM TIME FROM FRANKF TO BIGGS  IS       33.59
ROUTE IS
FRANKF      BIGGS

MAXIMUM-FLOW ROUTE FROM BIGGS  TO FRANKF IS
BIGGS       GOOSE       FRANKF
TIME IS      33.75   PAYLOAD IS   215400.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MINIMUM TIME FROM FRANKF TO CAMPBL IS       27.82
ROUTE IS
FRANKF      CAMPBL

MAXIMUM-FLOW ROUTE FROM CAMPBL TO FRANKF IS
CAMPBL      GOOSE       FRANKF
TIME IS      27.86   PAYLOAD IS   215400.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MINIMUM TIME FROM FRANKF TO HOOD   IS       31.97
ROUTE IS
FRANKF      HOOD

MAXIMUM-FLOW ROUTE FROM HOOD   TO FRANKF IS
HOOD        GOOSE       FRANKF
TIME IS      31.97   PAYLOAD IS   215400.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MINIMUM TIME FROM FRANKF TO HICKAM IS       49.81
ROUTE IS
FRANKF      GOOSE       HICKAM

MAXIMUM-FLOW ROUTE FROM HICKAM TO FRANKF IS
HICKAM      BIGGS       GOOSE       FRANKF
TIME IS      53.42   PAYLOAD IS   215400.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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ROUTES FOR C-141A AIRCRAFT
    COMPARTMENT IS    123.0 WIDE,    109.0 HIGH AND    840.0 LONG (  120. PASSENGERS)
    MAXIMUM PAYLOAD IS    67600.0 REDUCED PAYLOAD IS    30000.0 RANGES ARE    3920.0    5750.0    6350.0
    SPEED IS      422.   STEPH=      2.0C

MINIMUM TIME FROM FRANKF TO BIGGS  IS       34.07
ROUTE IS
FRANKF      BIGGS

MAXIMUM-FLOW ROUTE FROM BIGGS  TO FRANKF IS
BIGGS       GOOSE       FRANKF
TIME IS      34.23   PAYLOAD IS    67600.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MINIMUM TIME FROM FRANKF TO CAMPBL IS       28.21
ROUTE IS
FRANKF      CAMPBL

MAXIMUM-FLOW ROUTE FROM CAMPBL TO FRANKF IS
CAMPBL      GOOSE       FRANKF
TIME IS      28.25   PAYLOAD IS    67600.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MINIMUM TIME FROM FRANKF TO HOOD   IS       32.43
ROUTE IS
FRANKF      HOOD

MAXIMUM-FLOW ROUTE FROM HOOD   TO FRANKF IS
HOOD        GOOSE       FRANKF
TIME IS      32.43   PAYLOAD IS    67600.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MINIMUM TIME FROM FRANKF TO HICKAM IS       50.51
ROUTE IS
FRANKF      GOOSE       HICKAM

MAXIMUM-FLOW ROUTE FROM HICKAM TO FRANKF IS
HICKAM      BIGGS       GOOSE       FRANKF
TIME IS      54.18   PAYLOAD IS    67600.0

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ROUTES FOR C-141C AIRCRAFT
     COMPARTMENT IS      1.0 WIDE,       1.0 HIGH AND      1.0 LONG (  120. PASSENGERS)
     MAXIMUM PAYLOAD IS    57200.0 REDUCED PAYLOAD IS    19600.0 RANGES ARE    3920.0    5750.0    6120.0
     SPEED IS      432.  GTPFH=       2.0C
DENIED BASES    14

MINIMUM TIME FROM FRANKF TO BIGGS  IS       33.28
ROUTE IS
FRANKF      BIGGS

MAXIMUM-FLOW ROUTE FROM BIGGS  TO FRANKF IS
BIGGS       GOOSE       FRANKF
TIME IS      33.43   PAYLOAD IS    57200.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MINIMUM TIME FROM FRANKF TO CAMPBL IS       27.56
ROUTE IS
FRANKF      CAMPBL

MAXIMUM-FLOW ROUTE FROM CAMPBL TO FRANKF IS
CAMPBL      GOOSE       FRANKF
TIME IS      27.60   PAYLOAD IS    57200.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MINIMUM TIME FROM FRANKF TO HOOD   IS       31.68
ROUTE IS
FRANKF      HOOD

MAXIMUM-FLOW ROUTE FROM HOOD   TO FRANKF IS
HOOD        GOOSE       FRANKF
TIME IS      31.68   PAYLOAD IS    57200.0

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

MINIMUM TIME FROM FRANKF TO HICKAM IS       49.34
ROUTE IS
FRANKF      GOOSE       HICKAM

MAXIMUM-FLOW ROUTE FROM HICKAM TO FRANKF IS
HICKAM      BIGGS       GOOSE       FRANKF
TIME IS      52.92   PAYLOAD IS    57200.0

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STOCK LISTS

FLAG	BASE	QUANTITY	UNIT	LIST
1	CAMPBL	1.00	4	-1
2	CAMPBL	10.00	4	1
3	HICKAM	1.00	1	-1
4	HICKAM	10.00	1	1
5	HOOD	1.00	2	-1
6	HOOD	10.00	2	1
7	BIGGS	1.00	11	-1

PRIORITY GROUP 1

FLAGS									QUANTITY	UNIT	LIST
1	2	0	0	0	0	0	0	0	1.00	4	-1
1	2	0	0	0	0	0	0	0	10.00	4	1

VEHICLES IN PRIORITY GROUP

NAME	NUMBER	WIDTH	HEIGHT	LENGTH	WEIGHT	QUANTITY
MEN	1	30.0	0.0	20.0	240.0	14130
K31795	4	117.0	156.0	697.0	6161.0	88
F39378	7	133.0	149.0	577.0	60800.0	3
X48914	10	106.0	123.0	269.0	22960.0	1
S72024	14	112.0	98.0	352.0	13980.0	3
S74079	17	103.0	146.0	347.0	15850.0	7
S74490	18	101.0	134.0	320.0	16343.0	8
X40009	19	100.0	81.0	265.0	15180.0	122
X40146	20	100.0	81.0	279.0	15570.0	70
X40283	21	100.0	81.0	329.0	14876.0	1
X59326	25	102.0	86.0	264.0	19387.0	18
X62340	30	104.0	130.0	265.0	15760.0	2
T13152	44	100.0	119.0	335.0	32780.0	1
F43077	46	106.0	89.0	203.0	15470.0	3
J74920	47	95.0	90.0	309.0	20940.0	4
X63162	48	100.0	101.0	303.0	23960.0	11
E02670	58	101.0	51.0	188.0	2720.0	8
W94030	59	99.0	58.0	148.0	2750.0	6
W95537	63	78.0	50.0	147.0	1350.0	505
W95811	64	87.0	55.0	166.0	2670.0	79
W98825	65	86.0	81.0	162.0	2530.0	79
X38639	66	70.0	53.0	142.0	2895.0	1
X38776	67	87.0	91.0	200.0	6900.0	484
X39735	68	80.0	65.0	186.0	5660.0	484
X39872	69	80.0	65.0	191.0	5836.0	192
X57271	70	100.0	92.0	264.0	14600.0	2
X60833	74	68.0	53.0	132.0	2450.0	818
F11866	176	101.0	76.0	214.0	8910.0	2
W89557	231	71.0	58.0	122.0	6800.0	4
X43434	250	100.0	83.0	273.0	15770.0	27
X49051	253	111.0	98.0	107.0	33600.0	3
YA0002	265	100.0	100.0	167.0	4120.0	5
J36109	486	38.0	56.0	99.0	2940.0	2
X23227	608	74.0	48.0	102.0	1000.0	108

CARGO WEIGHT IS 7933.74 TONS NUMBER OF PERSONNEL IS 14130

CARGO COVERS 349.7 THOUSAND SQUARE FEET OF FLOOR SPACE, AND WEIGHS 45.37 POUNDS PER SQUARE FOOT

AIRCRAFT ARRIVALS

BASE	FLAGS		AIRCRAFT TYPE	QUANTITY	TIME BEFORE FIRST	TIME BETWEEN
CAMPBL	1	1	C-5A	30	0.0	0.50

	AIRCRAFT	ONLOAD BASE	TOTAL WEIGHT LOADED	UNUSED CAPACITY	CARGO WEIGHT	NUMBER OF PERSONNEL
1	C-5A	CAMPBL	211800.0	3600.0	211800.0	0
2	C-5A	CAMPBL	208241.0	7159.0	208241.0	0
3	C-5A	CAMPBL	109639.0	105761.0	109639.0	0
4	C-5A	CAMPBL	75722.0	139678.0	75722.0	0
5	C-5A	CAMPBL	82009.0	133391.0	82009.0	0
6	C-5A	CAMPBL	110257.0	105143.0	110257.0	0
7	C-5A	CAMPBL	110257.0	105143.0	110257.0	0
8	C-5A	CAMPBL	110257.0	105143.0	110257.0	0
9	C-5A	CAMPBL	83458.0	131942.0	83458.0	0
10	C-5A	CAMPBL	81814.0	133586.0	81814.0	0
11	C-5A	CAMPBL	52575.0	162825.0	52575.0	0
12	C-5A	CAMPBL	86072.0	129328.0	86072.0	0
13	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
14	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
15	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
16	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
17	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
18	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
19	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
20	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
21	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
22	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
23	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
24	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
25	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
26	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
27	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
28	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
29	C-5A	CAMPBL	89222.0	126178.0	89222.0	0
30	C-5A	CAMPBL	89222.0	126178.0	89222.0	0

ALL AIRCRAFT LOADED FROM LIST WITH FLAG NUMBER 1

AIRCRAFT ARRIVALS

BASE	FLAGS		AIRCRAFT TYPE	QUANTITY	TIME BEFORE FIRST	TIME BETWEEN
CAMPBL	1	2	C-141A	100	10.00	0.50

	AIR CRAFT	ONLOAD BASE	TOTAL WEIGHT LOADED	UNUSED CAPACITY	CARGO WEIGHT	NUMBER OF PERSONNEL
1	C-141A	CAMPBL	31900.0	35700.0	31900.0	0
2	C-141A	CAMPBL	33280.0	34320.0	33280.0	0
3	C-141A	CAMPBL	45540.0	22060.0	45540.0	0
4	C-141A	CAMPBL	45540.0	22060.0	45540.0	0
5	C-141A	CAMPBL	45540.0	22060.0	45540.0	0
6	C-141A	CAMPBL	45540.0	22060.0	45540.0	0
7	C-141A	CAMPBL	45540.0	22060.0	45540.0	0
8	C-141A	CAMPBL	45540.0	22060.0	45540.0	0
9	C-141A	CAMPBL	45540.0	22060.0	45540.0	0
10	C-141A	CAMPBL	45540.0	22060.0	45540.0	0
11	C-141A	CAMPBL	45540.0	22060.0	45540.0	0
12	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
13	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
14	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
15	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
16	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
17	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
18	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
19	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
20	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
21	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
22	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
23	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
24	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
25	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
26	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
27	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
28	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
29	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
30	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
31	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
32	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
33	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
34	C-141A	CAMPBL	46710.0	20890.0	46710.0	0
35	C-141A	CAMPBL	33196.0	34404.0	33196.0	0
36	C-141A	CAMPBL	50670.0	16930.0	50670.0	0
37	C-141A	CAMPBL	50670.0	16930.0	50670.0	0
38	C-141A	CAMPBL	50670.0	16930.0	50670.0	0
39	C-141A	CAMPBL	50670.0	16930.0	50670.0	0
40	C-141A	CAMPBL	50590.0	17010.0	50590.0	0
41	C-141A	CAMPBL	53160.0	14440.0	53160.0	0
42	C-141A	CAMPBL	47310.0	20290.0	47310.0	0
43	C-141A	CAMPBL	47310.0	20290.0	47310.0	0
44	C-141A	CAMPBL	47310.0	20290.0	47310.0	0
45	C-141A	CAMPBL	47310.0	20290.0	47310.0	0
46	C-141A	CAMPBL	47310.0	20290.0	47310.0	0
47	C-141A	CAMPBL	47310.0	20290.0	47310.0	0
48	C-141A	CAMPBL	47310.0	20290.0	47310.0	0
49	C-141A	CAMPBL	47310.0	20290.0	47310.0	0
50	C-141A	CAMPBL	47310.0	20290.0	47310.0	0

51	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
52	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
53	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
54	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
55	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
56	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
57	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
58	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
59	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
60	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
61	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
62	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
63	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
64	C-141A	CAMPBL	13350.0	54250.0	13350.0	0
65	C-141A	CAMPBL	13210.0	54390.0	13210.0	0
66	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
67	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
68	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
69	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
70	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
71	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
72	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
73	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
74	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
75	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
76	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
77	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
78	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
79	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
80	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
81	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
82	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
83	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
84	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
85	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
86	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
87	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
88	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
89	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
90	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
91	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
92	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
93	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
94	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
95	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
96	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
97	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
98	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
99	C-141A	CAMPBL	27600.0	40000.0	27600.0	0
100	C-141A	CAMPBL	27600.0	40000.0	27600.0	0

ALL AIRCRAFT LOADED FROM LIST WITH FLAG NUMBER 1

AIRCRAFT ARRIVALS

BASE	FLAGS		AIRCRAFT TYPE	QUANTITY	TIME BEFORE FIRST	TIME BETWEEN
CAMPBL	2	2	C-141C	100	10.00	0.50

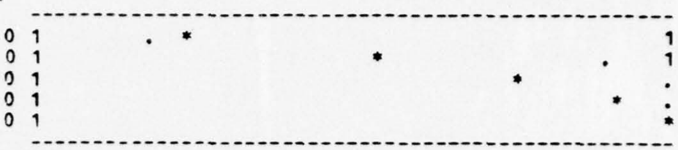
	AIR CRAFT	ONLOAD BASE	TOTAL WEIGHT LOADED	UNUSED CAPACITY	CARGO WEIGHT	NUMBER OF PERSONNEL
1	C-141C	CAMPBL	28800.0	28400.0	0.0	120
2	C-141C	CAMPBL	28800.0	28400.0	0.0	120
3	C-141C	CAMPBL	28800.0	28400.0	0.0	120
4	C-141C	CAMPBL	28800.0	28400.0	0.0	120
5	C-141C	CAMPBL	28800.0	28400.0	0.0	120
6	C-141C	CAMPBL	28800.0	28400.0	0.0	120
7	C-141C	CAMPBL	28800.0	28400.0	0.0	120
8	C-141C	CAMPBL	28800.0	28400.0	0.0	120
9	C-141C	CAMPBL	28800.0	28400.0	0.0	120
10	C-141C	CAMPBL	28800.0	28400.0	0.0	120
11	C-141C	CAMPBL	28800.0	28400.0	0.0	120
12	C-141C	CAMPBL	28800.0	28400.0	0.0	120
13	C-141C	CAMPBL	28800.0	28400.0	0.0	120
14	C-141C	CAMPBL	28800.0	28400.0	0.0	120
15	C-141C	CAMPBL	28800.0	28400.0	0.0	120
16	C-141C	CAMPBL	28800.0	28400.0	0.0	120
17	C-141C	CAMPBL	28800.0	28400.0	0.0	120
18	C-141C	CAMPBL	28800.0	28400.0	0.0	120
19	C-141C	CAMPBL	28800.0	28400.0	0.0	120
20	C-141C	CAMPBL	28800.0	28400.0	0.0	120
21	C-141C	CAMPBL	28800.0	28400.0	0.0	120
22	C-141C	CAMPBL	28800.0	28400.0	0.0	120
23	C-141C	CAMPBL	28800.0	28400.0	0.0	120
24	C-141C	CAMPBL	28800.0	28400.0	0.0	120
25	C-141C	CAMPBL	28800.0	28400.0	0.0	120
26	C-141C	CAMPBL	28800.0	28400.0	0.0	120
27	C-141C	CAMPBL	28800.0	28400.0	0.0	120
28	C-141C	CAMPBL	28800.0	28400.0	0.0	120
29	C-141C	CAMPBL	28800.0	28400.0	0.0	120
30	C-141C	CAMPBL	28800.0	28400.0	0.0	120
31	C-141C	CAMPBL	28800.0	28400.0	0.0	120
32	C-141C	CAMPBL	28800.0	28400.0	0.0	120
33	C-141C	CAMPBL	28800.0	28400.0	0.0	120
34	C-141C	CAMPBL	28800.0	28400.0	0.0	120
35	C-141C	CAMPBL	28800.0	28400.0	0.0	120
36	C-141C	CAMPBL	28800.0	28400.0	0.0	120
37	C-141C	CAMPBL	28800.0	28400.0	0.0	120
38	C-141C	CAMPBL	28800.0	28400.0	0.0	120
39	C-141C	CAMPBL	28800.0	28400.0	0.0	120
40	C-141C	CAMPBL	28800.0	28400.0	0.0	120
41	C-141C	CAMPBL	28800.0	28400.0	0.0	120
42	C-141C	CAMPBL	28800.0	28400.0	0.0	120
43	C-141C	CAMPBL	28800.0	28400.0	0.0	120
44	C-141C	CAMPBL	28800.0	28400.0	0.0	120
45	C-141C	CAMPBL	28800.0	28400.0	0.0	120
46	C-141C	CAMPBL	28800.0	28400.0	0.0	120
47	C-141C	CAMPBL	28800.0	28400.0	0.0	120
48	C-141C	CAMPBL	28800.0	28400.0	0.0	120
49	C-141C	CAMPBL	28800.0	28400.0	0.0	120
50	C-141C	CAMPBL	28800.0	28400.0	0.0	120

51	C-141C	CAMPBL	28800.0	28400.0	0.0	120
52	C-141C	CAMPBL	28800.0	28400.0	0.0	120
53	C-141C	CAMPBL	28800.0	28400.0	0.0	120
54	C-141C	CAMPBL	28800.0	28400.0	0.0	120
55	C-141C	CAMPBL	28800.0	28400.0	0.0	120
56	C-141C	CAMPBL	28800.0	28400.0	0.0	120
57	C-141C	CAMPBL	28800.0	28400.0	0.0	120
58	C-141C	CAMPBL	28800.0	28400.0	0.0	120
59	C-141C	CAMPBL	28800.0	28400.0	0.0	120
60	C-141C	CAMPBL	28800.0	28400.0	0.0	120
61	C-141C	CAMPBL	28800.0	28400.0	0.0	120
62	C-141C	CAMPBL	28800.0	28400.0	0.0	120
63	C-141C	CAMPBL	28800.0	28400.0	0.0	120
64	C-141C	CAMPBL	28800.0	28400.0	0.0	120
65	C-141C	CAMPBL	28800.0	28400.0	0.0	120
66	C-141C	CAMPBL	28800.0	28400.0	0.0	120
67	C-141C	CAMPBL	28800.0	28400.0	0.0	120
68	C-141C	CAMPBL	28800.0	28400.0	0.0	120
69	C-141C	CAMPBL	28800.0	28400.0	0.0	120
70	C-141C	CAMPBL	28800.0	28400.0	0.0	120
71	C-141C	CAMPBL	28800.0	28400.0	0.0	120
72	C-141C	CAMPBL	28800.0	28400.0	0.0	120
73	C-141C	CAMPBL	28800.0	28400.0	0.0	120
74	C-141C	CAMPBL	28800.0	28400.0	0.0	120
75	C-141C	CAMPBL	28800.0	28400.0	0.0	120
76	C-141C	CAMPBL	28800.0	28400.0	0.0	120
77	C-141C	CAMPBL	28800.0	28400.0	0.0	120
78	C-141C	CAMPBL	28800.0	28400.0	0.0	120
79	C-141C	CAMPBL	28800.0	28400.0	0.0	120
80	C-141C	CAMPBL	28800.0	28400.0	0.0	120
81	C-141C	CAMPBL	28800.0	28400.0	0.0	120
82	C-141C	CAMPBL	28800.0	28400.0	0.0	120
83	C-141C	CAMPBL	28800.0	28400.0	0.0	120
84	C-141C	CAMPBL	28800.0	28400.0	0.0	120
85	C-141C	CAMPBL	28800.0	28400.0	0.0	120
86	C-141C	CAMPBL	28800.0	28400.0	0.0	120
87	C-141C	CAMPBL	28800.0	28400.0	0.0	120
88	C-141C	CAMPBL	28800.0	28400.0	0.0	120
89	C-141C	CAMPBL	28800.0	28400.0	0.0	120
90	C-141C	CAMPBL	28800.0	28400.0	0.0	120
91	C-141C	CAMPBL	28800.0	28400.0	0.0	120
92	C-141C	CAMPBL	28800.0	28400.0	0.0	120
93	C-141C	CAMPBL	28800.0	28400.0	0.0	120
94	C-141C	CAMPBL	28800.0	28400.0	0.0	120
95	C-141C	CAMPBL	28800.0	28400.0	0.0	120
96	C-141C	CAMPBL	28800.0	28400.0	0.0	120
97	C-141C	CAMPBL	28800.0	28400.0	0.0	120
98	C-141C	CAMPBL	28800.0	28400.0	0.0	120
99	C-141C	CAMPBL	28800.0	28400.0	0.0	120
100	C-141C	CAMPBL	28800.0	28400.0	0.0	120

ALL AIRCRAFT LOADED FROM LIST WITH FLAG NUMBER 2

DELIVERIES OF MATERIEL AND PERSONNEL FROM PRIORITY GROUP 1 TO OFFLOAD BASE

PERSONNEL	PERCENT OF PERSONNEL	PERCENT OF CARGO	DAY	HOUR
2520	17.83	24.10	2	0
12840	90.87	53.36	4	0
14130	100.00	75.65	6	0
14130	100.00	92.31	8	0
14130	100.00	100.00	10	0



ITEMS IN PRIORITY GROUP NOT DELIVERED

VEHICLES IN PRIORITY GROUP

NAME NUMBER WIDTH HEIGHT LENGTH WEIGHT QUANTITY

CARGO WEIGHT IS 0.0 TONS NUMBER OF PERSONNEL IS 0

CARGO COVERS 0.0 THOUSAND SQUARE FEET OF FLOOR SPACE, AND WEIGHS 0.0 POUNDS PEF SQUARE FCCT

PRIORITY GROUP 2

FLAGS									QUANTITY	UNIT	LIST
3	4	5	6	0	0	0	0	0	1.00	1	-1
3	4	5	6	0	0	0	0	0	10.00	1	1
3	4	5	6	0	0	0	0	0	1.00	2	-1
3	4	5	6	0	0	0	0	0	10.00	2	1

VEHICLES IN PRIORITY GROUP

NAME	NUMBER	WIDTH	HEIGHT	LENGTH	WEIGHT	QUANTITY
MEN	1	30.0	0.0	20.0	240.0	33480
K31795	4	117.0	156.0	697.0	6161.0	51
C20414	5	77.0	66.0	264.0	30946.0	26
F39241	6	121.0	135.0	268.0	36345.0	8
F39378	7	133.0	149.0	577.0	60600.0	6
I43664	8	148.0	112.0	340.0	87700.0	22
W76816	9	140.0	131.0	233.0	48960.0	17
X48914	10	106.0	123.0	269.0	22960.0	12
K90188	11	103.0	129.0	269.0	16860.0	74
S70243	12	101.0	121.0	593.0	17435.0	2
S70517	13	119.0	67.0	416.0	16285.0	22
S72024	14	112.0	98.0	352.0	13980.0	75
S72983	15	101.0	109.0	377.0	15470.0	48
S73394	16	132.0	94.0	479.0	45870.0	8
S74079	17	103.0	146.0	347.0	15850.0	18
S74490	18	101.0	134.0	320.0	16343.0	19
X40009	19	100.0	81.0	265.0	15180.0	926
X40146	20	100.0	81.0	279.0	15570.0	639
X40283	21	100.0	81.0	329.0	14876.0	8
X40831	22	102.0	86.0	304.0	20910.0	221
X40968	23	119.0	87.0	320.0	21771.0	254
X43845	24	102.0	91.0	289.0	23847.0	67
X59326	25	102.0	86.0	264.0	19387.0	173
X59463	26	106.0	86.0	280.0	20107.0	2
X59600	27	119.0	111.0	288.0	30612.0	8
X59874	28	119.0	111.0	290.0	30082.0	22
X60696	29	121.0	99.0	360.0	33874.0	2
X62340	30	104.0	130.0	265.0	15760.0	151
X62477	31	104.0	130.0	279.0	16102.0	16
X63299	32	103.0	106.0	355.0	34820.0	87
K27486	33	102.0	98.0	391.0	26560.0	16
I45534	34	124.0	148.0	513.0	42680.0	8
A93125	35	115.0	98.0	249.0	29960.0	54
E56577	36	151.0	130.0	354.0	110560.0	11
J96694	37	110.0	105.0	192.0	24200.0	48
K56981	38	128.0	108.0	265.0	57630.0	16
K57666	39	129.0	110.0	355.0	49048.0	108
B50544	40	128.0	115.0	254.0	48448.0	31
B50681	41	139.0	118.0	321.0	107600.0	47
V13101	42	148.0	129.0	325.0	97000.0	378
T10275	43	101.0	129.0	322.0	20000.0	2
T13152	44	100.0	119.0	335.0	32780.0	2
D12087	55	104.0	84.0	192.0	20125.0	447
D11401	56	79.0	91.0	168.0	13503.0	253
D11538	57	105.0	104.0	192.0	22415.0	160
EC2670	58	101.0	51.0	188.0	2720.0	10
W94030	59	99.0	58.0	148.0	2750.0	207
W95263	61	93.0	51.0	150.0	1640.0	4
W95537	63	78.0	50.0	147.0	1350.0	872
W95811	64	87.0	55.0	166.0	2670.0	1297
W98825	65	86.0	81.0	162.0	2530.0	236

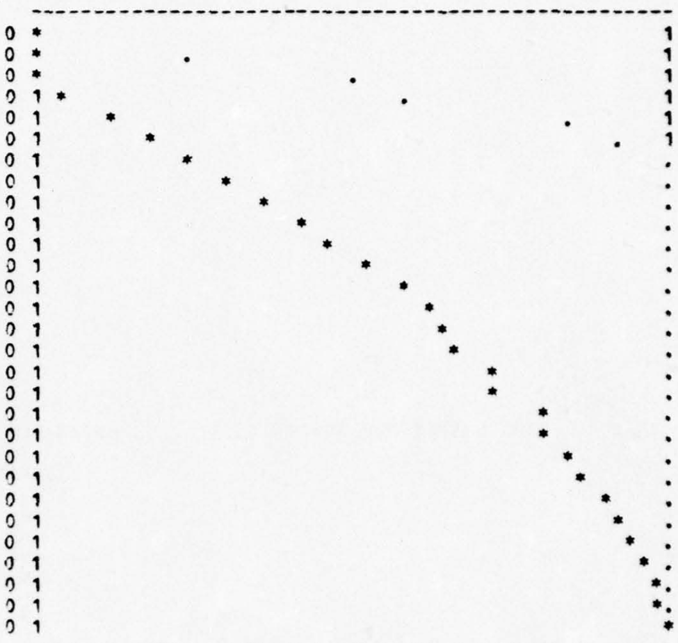
X38639	66	70.0	53.0	142.0	2895.0	95
X38776	67	87.0	91.0	200.0	6900.0	83
X39735	68	80.0	65.0	186.0	5660.0	1156
X39872	69	80.0	65.0	191.0	5836.0	284
X57271	70	100.0	92.0	264.0	14600.0	41
X57408	71	100.0	92.0	278.0	15022.0	4
X59052	72	98.0	82.0	229.0	11703.0	4
X59189	73	98.0	82.0	243.0	12143.0	2
X60833	74	68.0	53.0	132.0	2450.0	1966
K57529	76	91.0	70.0	284.0	4780.0	54
K29660	111	132.0	150.0	626.0	7475.0	24
S56941	192	104.0	82.0	290.0	12675.0	18

CARGO WEIGHT IS 73262.94 TONS NUMBER OF PERSONNEL IS 33480

CARGO COVERS 1533.5 THOUSAND SQUARE FEET OF FLOOR SPACE, AND WEIGHS 95.55 POUNDS PER SQUARE FOOT

DELIVERIES OF MATERIEL AND PERSONNEL FROM PRIORITY GROUP 2 TO OFFLOAD BASE

PERSONNEL	PERCENT OF PERSONNEL	PERCENT OF CARGO	DAY	HOUR
0	0.0	0.0	4	0
8280	24.73	0.0	6	0
16560	49.46	0.0	8	0
19550	58.39	4.81	10	0
27950	83.48	11.74	12	0
30950	92.44	17.22	14	0
33480	100.00	23.13	16	0
33480	100.00	29.85	18	0
33480	100.00	36.55	20	0
33480	100.00	41.08	22	0
33480	100.00	45.96	24	0
33480	100.00	52.46	26	0
33480	100.00	58.42	28	0
33480	100.00	62.14	30	0
33480	100.00	64.06	32	0
33480	100.00	66.10	34	0
33480	100.00	71.57	36	0
33480	100.00	72.41	38	0
33480	100.00	79.06	40	0
33480	100.00	80.42	42	0
33480	100.00	84.71	44	0
33480	100.00	86.35	46	0
33480	100.00	90.62	48	0
33480	100.00	92.67	50	0
33480	100.00	94.16	52	0
33480	100.00	95.23	54	0
33480	100.00	98.14	56	0
33480	100.00	98.59	58	0
33480	100.00	100.00	60	0



ITEMS IN PRIORITY GROUP NOT DELIVERED

VEHICLES IN PRIORITY GROUP

NAME	NUMBER	WIDTH	HEIGHT	LENGTH	WEIGHT	QUANTITY

CARGO WEIGHT IS 0.0 TONS NUMBER OF PERSONNEL IS 0

CARGO COVERS 0.0 THOUSAND SQUARE FEET OF FLOOR SPACE, AND WEIGHS 0.0 POUNDS PER SQUARE FOOT

PRIORITY GROUP 3

FLAGS								QUANTITY	UNIT	LIST
7	7	0	0	0	0	0	0	1.00	11	-1

VEHICLES IN PRIORITY GROUP

NAME	NUMBER	WIDTH	HEIGHT	LENGTH	WEIGHT	QUANTITY
K31795	4	117.0	156.0	697.0	6161.0	5
C20414	5	77.0	66.0	264.0	30946.0	3
X40009	19	100.0	81.0	265.0	15180.0	82
X40831	22	102.0	86.0	304.0	20910.0	40
X62340	30	104.0	130.0	265.0	15760.0	3
X63299	32	103.0	106.0	355.0	34820.0	10
K57666	39	129.0	110.0	355.0	49048.0	18
R50544	40	128.0	115.0	254.0	48448.0	15
R50681	41	139.0	118.0	321.0	107600.0	3
D12087	55	104.0	84.0	192.0	20125.0	26
D11401	56	79.0	91.0	168.0	13503.0	51
D11538	57	105.0	104.0	192.0	22415.0	10
X38639	66	70.0	53.0	142.0	2895.0	3
X38776	67	87.0	91.0	200.0	6900.0	1
X39735	68	80.0	65.0	186.0	5660.0	62
X57408	71	100.0	92.0	276.0	15022.0	21
X60833	74	68.0	53.0	132.0	2450.0	112
V12826	82	130.0	109.0	277.0	46580.0	51
V12963	83	147.0	117.0	292.0	99500.0	51

CARGO WEIGHT IS 7187.58 TONS NUMBER OF PERSONNEL IS 0

CARGO COVERS 95.5 THOUSAND SQUARE FEET OF FLOOR SPACE, AND WEIGHS 150.46 POUNDS PER SQUARE FOOT

DELIVERIES OF MATERIEL AND PERSONNEL FROM PRIORITY GROUP 3 TO OFFLOAD BASE

PERSONNEL	PERCENT OF PERSONNEL	PERCENT OF CARGO	DAY	HOUR
0	0.0	0.0	58	0
0	0.0	31.10	60	0
0	0.0	64.27	62	0
0	0.0	83.29	64	0
0	0.0	100.00	66	0

```
ITEMS IN PRIORITY GROUP NOT DELIVERED

VEHICLES IN PRIORITY GROUP

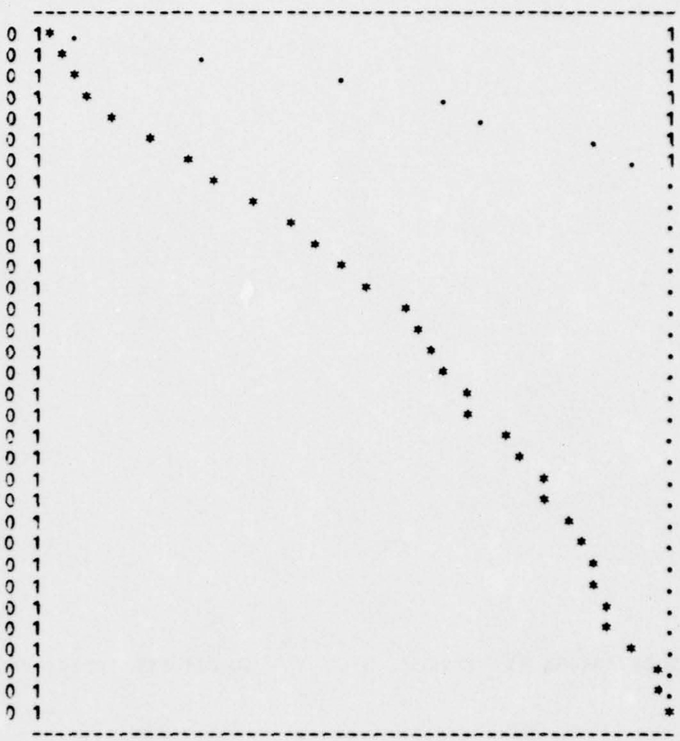
 NAME    NUMBER    WIDTH    HEIGHT    LENGTH    WEIGHT    QUANTITY

CARGO WEIGHT IS          0.0  TONS  NUMBER OF PERSONNEL IS          0

CARGO COVERS          0.0 THOUSAND SQUARE FEET OF FLOOR SPACE, AND WEIGHS      0.0  POUNDS PER SQUARE FOOT
```

CUMULATIVE DELIVERIES OF MATERIEL AND PERSONNEL FROM ALL PRIORITY GROUPS TO OFFLOAD BASE

PERSONNEL	PERCENT OF PERSONNEL	PERCENT OF CARGO	DAY	HOUR
2520	5.29	2.16	2	0
12840	26.97	4.79	4	0
22410	47.07	6.79	6	0
30690	64.46	8.29	8	0
33680	70.74	12.96	10	0
42080	88.38	18.71	12	0
45080	94.69	23.25	14	0
47610	100.00	28.15	16	0
47610	100.00	33.72	18	0
47610	100.00	39.27	20	0
47610	100.00	43.03	22	0
47610	100.00	47.07	24	0
47610	100.00	52.46	26	0
47610	100.00	57.40	28	0
47610	100.00	60.49	30	0
47610	100.00	62.08	32	0
47610	100.00	63.76	34	0
47610	100.00	68.30	36	0
47610	100.00	69.00	38	0
47610	100.00	74.51	40	0
47610	100.00	75.64	42	0
47610	100.00	79.19	44	0
47610	100.00	80.55	46	0
47610	100.00	84.09	48	0
47610	100.00	85.79	50	0
47610	100.00	87.03	52	0
47610	100.00	87.91	54	0
47610	100.00	90.32	56	0
47610	100.00	90.70	58	0
47610	100.00	94.40	60	0
47610	100.00	97.09	62	0
47610	100.00	98.64	64	0
47610	100.00	100.00	66	0



OFFLOAD BASE ACTIVITY

FROM* DAY	HOUR	****TO** DAY	HOUR	ARRIVALS	DEPARTURES	TOTAL ACTIVITY	AIRCRAFT LEFT AT THE BASE
0	0	2	0	71	71	142	0
2	0	4	0	195	195	390	0
4	0	6	0	190	190	380	0
6	0	8	0	172	172	344	0
8	0	10	0	122	122	244	0
10	0	12	0	166	113	279	53
12	0	14	0	122	97	219	78
14	0	16	0	117	95	212	100
16	0	18	0	97	97	194	100
18	0	20	0	96	96	192	100
20	0	22	0	102	102	204	100
22	0	24	0	90	90	180	100
24	0	26	0	96	96	192	100
26	0	28	0	97	97	194	100
28	0	30	0	107	107	214	100
30	0	32	0	85	85	170	100
32	0	34	0	28	28	56	100
34	0	36	0	92	92	184	100
36	0	38	0	17	17	34	100
38	0	40	0	97	97	194	100
40	0	42	0	33	33	66	100
42	0	44	0	78	78	156	100
44	0	46	0	52	52	104	100
46	0	48	0	68	68	136	100
48	0	50	0	62	62	124	100
50	0	52	0	58	58	116	100
52	0	54	0	72	72	144	100
54	0	56	0	56	56	112	100
56	0	58	0	74	74	148	100
58	0	60	0	113	38	151	175
60	0	62	0	43	15	58	203
62	0	64	0	14	0	14	217
64	0	66	0	13	0	13	230
66	0	68	0	0	0	0	230
68	0	70	0	0	0	0	230
70	0	72	0	0	0	0	230
72	0	74	0	0	0	0	230
74	0	76	0	0	0	0	230
76	0	78	0	0	0	0	230
78	0	80	0	0	0	0	230
80	0	82	0	0	0	0	230
82	0	84	0	0	0	0	230
84	0	86	0	0	0	0	230
86	0	88	0	0	0	0	230
88	0	90	0	0	0	0	230
90	0	92	0	0	0	0	230
92	0	94	0	0	0	0	230
94	0	96	0	0	0	0	230
96	0	98	0	0	0	0	230
98	0	100	0	0	0	0	230
100	0	102	0	0	0	0	230
102	0	104	0	0	0	0	230
104	0	106	0	0	0	0	230
106	0	108	0	0	0	0	230
108	0	110	0	0	0	0	230
110	0	112	0	0	0	0	230
112	0	114	0	0	0	0	230

AIRCRAFT AVAILABILITY - C-5A

DAY	HOUR
61	22
61	22
61	23
62	2
62	3
62	4
62	4
62	5
62	5
62	7
62	7
62	8
62	8
62	9
62	9
62	21
63	21
64	1
64	2
64	2
64	3
64	3
64	14
64	14
64	15
64	15
64	16
64	16
64	17
64	17

AIRCRAFT AVAILABILITY - C-141A

DAY	HOUR
59	4
59	4
59	4
59	4
59	4
59	5
59	5
59	5
59	5
59	6
59	6
59	6
59	6
59	7
59	7
59	8
59	8
59	9
59	9
59	9
59	10
59	10
59	11
59	11
59	11
59	11
59	12
59	12
59	12
59	12
59	12
59	12
59	13
59	13
59	13
59	13
59	13
59	13
59	14
59	14
59	14
59	14
59	14
59	14
59	14
59	14
59	14
59	15
59	15
59	15
59	15
59	15
59	15
59	15
59	15
59	15
59	15
59	16

59	16
59	16
59	16
59	16
59	16
59	17
59	17
59	17
59	17
59	17
59	18
59	18
59	19
59	19
59	20
59	20
59	21
60	1
60	1
60	2
60	6
60	6
60	7
60	7
60	8
60	8
60	9
60	9
60	10
60	10
60	11
60	11
60	12
61	3
61	4
61	4
61	5
61	21
61	22
61	22
61	23
61	23

AIRCRAFT AVAILABILITY - C-141C

DAY	HOUR
10	8
10	9
10	14
10	15
10	15
10	16
10	16
10	17
10	17
10	18
10	18
10	19
10	19
10	20
10	20
10	21
10	21
10	22
10	22
10	23
11	7
11	8
11	8
11	9
11	9
11	10
11	10
11	11
11	11
11	12
11	12
11	13
11	13
11	14
11	14
11	15
11	15
11	16
11	16
11	17
11	17
11	18
11	18
11	19
11	19
11	20
11	20
11	21
11	21
11	22
11	22
11	23
11	23
12	0
12	0
12	1
12	1
12	2

12	2
12	3
13	15
13	15
13	16
13	16
13	17
13	17
13	18
13	18
13	19
13	19
13	20
13	20
13	21
13	21
13	22
13	22
13	23
13	23
14	0
14	0
14	1
14	1
14	2
14	2
14	3
14	3
14	4
14	4
14	5
14	5
14	6
14	6
14	7
14	7
14	8
14	8
14	9
14	9
14	10
14	10

TOTAL SORTIES

AIRCRAFT	NUMBER OF SORTIES
C-5A	615
C-141A	1882
C-141C	398

Appendix C

PROGRAMMER'S GUIDE

INTRODUCTION

This appendix is intended to be used by a programmer who is maintaining or modifying the Army Deployment Simulator computer program described in this report, although the section describing data input formats will be of use to the more casual user.

The program has a network phase and a loading phase. The loading phase is described in the greater detail.

As an aid to possible program modifications, COMMON block variables are defined. There is a table of program references to these variables. All input formats are listed with program variable names. The arguments for each subprogram are also explained.

Program modifications and problems, resolved and unresolved, are noted. In addition, there are some comments for improvement.

GENERAL STRUCTURE

The MAIN program calls subprograms to perform the tasks as illustrated in Fig. C.1.

NETWORK PHASE

Overview

The MAIN program clears COMMON, then calls a system routine to bypass printing error messages for division by zero. It then calls FRST to read data from card types 00, 01, and 02. Figure C.2 shows the calling sequence.

NETW controls the computations for the network phase. Its function is to input the data for the bases, find the minimum distances between bases, compute the minimum time back to the onload base along permissible links. It computes the routes to the offload base, using maximum flow as the criterion.

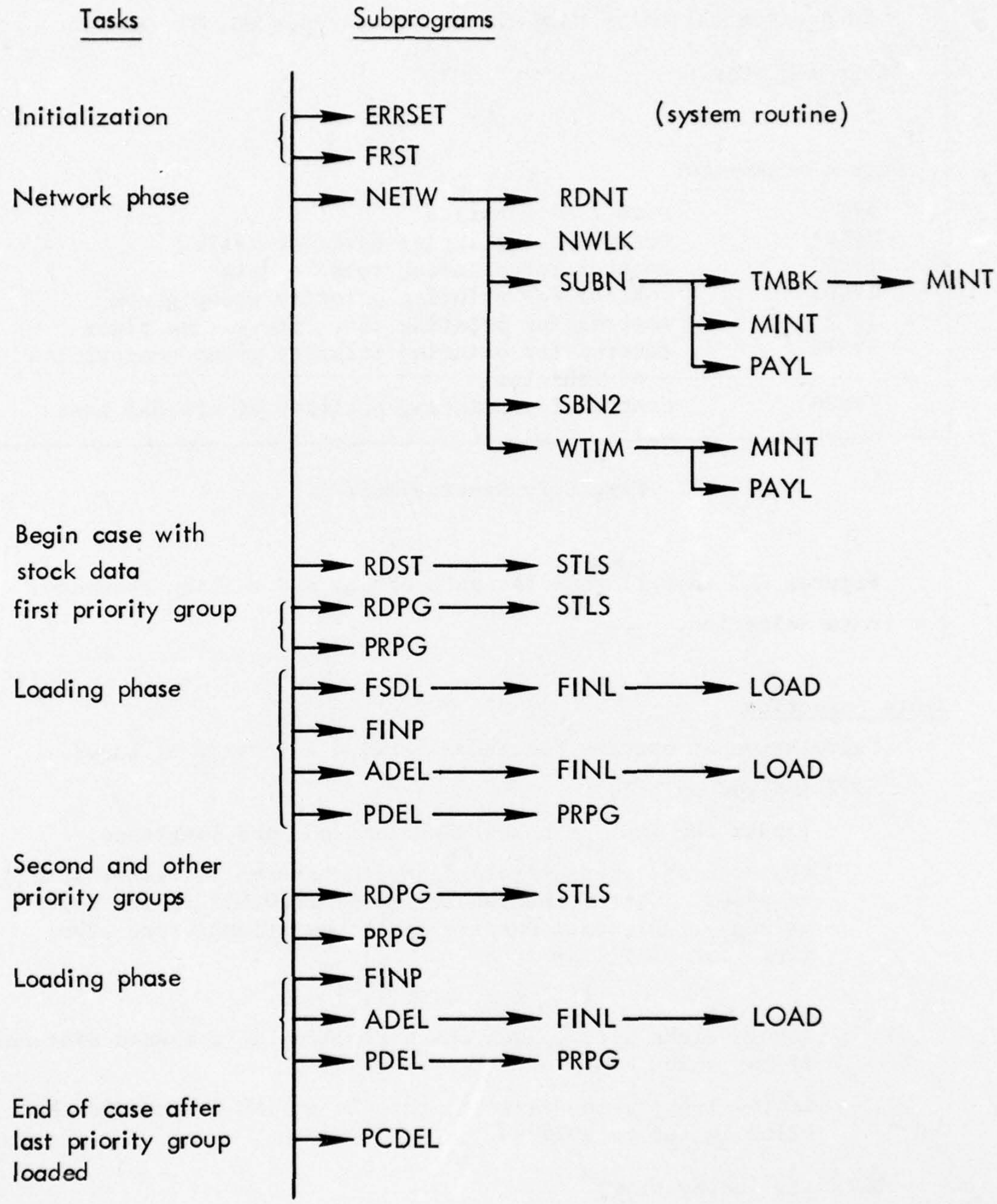

Tasks
Subprograms
Initialization
ERRSET
(system routine)
FRST
Network phase
NETW
RDNT
NWLK
SUBN
TMBK
MINT
MINT
PAYL
SBN2
WTIM
MINT
PAYL
Begin case with stock data
RDST
STLS
first priority group
RDPG
STLS
PRPG
Loading phase
FSDL
FINL
LOAD
FINP
ADEL
FINL
LOAD
PDEL
PRPG
Second and other priority groups
RDPG
STLS
PRPG
Loading phase
FINP
ADEL
FINL
LOAD
PDEL
PRPG
End of case after last priority group loaded
PCDEL

Fig. C-1

FRST (NVT, IVSP1, IVSP2, IVSP3, IVSP4, IVSP5, IVSP6)

Subprogram called by MAIN to read card types 00, 01, and 02.

Input arguments:

None

Output arguments:

NVT	number of vehicles
IVSP1	control for printing distance table
IVSP2	control for printing vehicle data
IVSP3	control for printing priority group graph
IVSP4	control for printing aircraft release times
IVSP5	control for printing priority group composition of vehicles
IVSP6	control for printing activity at offload base

Fig. C.2—Routine FRST

Figures C.3 to C.11 show the subprograms and calling sequences for route selection.

Route Selection

Calculation of nonstop distances between all pairs of bases.

RDNT (called by NETW)

Inputs the list of bases with latitude and longitude.

Computes the great circle distance between all combinations of bases. Stores the results in DIST(50,50) in the upper triangle. Diagonal entries and lower triangle are zero; i.e., for DIST(I,J)

$$\text{if } I \le J,\ DIST(I,J) = 0.$$

Inputs links with values which replace the computed distance if the value > 0.

If the input value is zero, this is a link denied and the value is set to 9999999.

NWLK (called by NETW)

Computes the shortest distance between nodes. These values are the same as those computed in RDNT except for links denied. Here the shortest route is computed as the sum of acceptable links from I to J, and the value 9999999 is replaced. No record is kept of the route. In later calculations, link denial information is not available.

SUBN (called by NETW) finds the node subnetwork

TMBK (called by SUBN) computes the time back

Reads the list of bases denied to A/C.

Creates the array NODE with a list of acceptable bases in descending order starting in position NODE(2). NODE(1) = the offload base. If there are fewer than 50 acceptable bases, it stores -1 in the slot following the last base.

MINT (called by TMBK)--The flow of this routine is described below:

MINT computes the minimum time between bases along a route where for each link in the route, the distance is ≤ the given distance (here it is the ferry range).

For a given "TO" base, it computes time for each "FROM" base if the distance between bases is ≤ the given distance. Time = (base distance/speed of A/C) × (1 + ground time per flying hour) + ground time at "TO" base + current minimum time at "FROM" base. If the time computed < the time stored previously for "TO" base, store the new time, "FROM" base index, and distance. This distance is the maximum of DIST(NTO, FROM) computed in NWLK, and the current value of the distance CL(FROM) computed in MINT. After the range of all "TO" bases is computed, repeat the computation loop if any of the distance values have been replaced.

The array TMIN (NTO) contains the minimum time between TO and FROM base.

NP (NTO) contains the index of the FROM base.
CL (NTO) contains the distance along the route between bases.

The computation terminates when no new minimum time is found on the current pass.

MINT returns the following values to SUBN:

TB array = the time back from TMIN
NSAVE taken from NP in MINT

Note that the CL distance array will change with each call to MINT. Prepare to find the route out, where maximum flow is the criterion.

Clear FLOW array.

Set CLM to ferry range (maximum distance in MINT computation).

(1) → Call MINT; on return, set CLMX to zero; compute flow for each node ND.

a. compute the payload for the A/C and distance for the current node link. PAYL function computes this value.
b. compute flow = payload/(time out and time back).
c. store flow in FLOW(ND) if > previous value. Store list of "nodes from" (NP(J) array) in NSUBN (ND,J) set CLMX to CL(ND) if CL(ND) > CLMX.

If the distance CLM used for MINT $\leq$ the range for maximum payload $\rightarrow$ DONE; or if CLMX, current max distance, $\leq 0 \rightarrow$ DONE; else set CLM = CLMX - 1; go compute MINT and payloads $\leq$ new range $\rightarrow$ (1)

NETW (IWAR, NACT, NNODES, IVSP1)

Subprogram called by MAIN to perform analysis.

Input arguments:

IVSP1	control for printing distance tables

Output arguments:

IWAR	offload base
NACT	number of aircraft types
NNODES	number of nodes (bases)

Fig. C.3—Routine NETW

RDNT (NNODES)

Subprogram called by NETW to read network data card types 03 and 04.

Input arguments:

None

Output argument:

NNODES	number of nodes (bases)

Fig. C.4—Routine RDNT

NWLK (NNODES, IVSP1)

Subprogram called by NETW to compute minimim distance along admissible links.

Input arguments:

NNODES	number of nodes (bases)
IVSP1	control for printing distance table

Output arguments:

None

Fig. C.5—Routine NWLK

SUBN (IAC, IWAR, NNODES, NBDN)

Subprogram called by NETW for each aircraft to find node subnetwork (routes out and back).

Input arguments:

IAC	aircraft type
IWAR	offload base
NNODES	number of nodes (bases)
NBDN	number of bases denied to the aircraft

Output arguments:

None

Fig. C.6—Routine SUBN

TMBK (IWAR, SPEEDX, RANGE, NNODES, NBDN)

Subprogram called by SUBN to compute minimum time back from offload base to each onload base.

Input arguments:

IWAR	offload base
SPEEDX	speed of the aircraft
RANGE	maximum distance
NNODES	number of nodes (bases)
NBDN	number of bases denied

Output arguments:

None

Fig. C.7—Routine TMBK

MINT (CLMAX, SPEEDX, WINDF, TMINX, TGDEST, CLX)

Subprogram called by SUBN, TMBK, or WTIM to find minimum time through a network.

Input arguments:

CLMAX	maximum distance
SPEEDX	speed of aircraft
WINDF	(never referenced)

Output arguments:

TMINX	minimum time between onload and offload base route, including ground time at each link and aircraft ground time per flying hour
TGDEST	total ground time at offload base
CLX	distance for route

Fig. C.8—Routine MINT

PAYL (I, DX)

Function subprogram called by SUBN or WTIM to compute maximum payload for a given aircraft and distance combination.

Input arguments:

I	aircraft
DX	distance

Fig. C.9—Routine PAYL

SBN2 (NOL, IWAR)

Subprogram called by NETW for each onload base for each aircraft to find routes out and back.

Input arguments:

NOL	onload base
IWAR	offload base

Output arguments:

None

Fig. C.10—Routine SBN2

WTIM (IAC)

Subprogram called by NETW for each onload base for each aircraft to compute weight-time table.

Input argument:

IAC	*aircraft type*

Output arguments:

None

Fig. C.11—Routine WTIM

Payload/Time Out Table

After the maximum flow route has been determined from each onload base, a table of payloads and time to fly over the route is prepared. Subprogram SBN2 stores the list of bases for the route in the array NODE for subprogram WTIM to use. For a given combination of aircraft, onload base, and maximum flow route, time and distance are computed over a range of distances from ferry range to maximum payload range. For each *distance in the table the function* PAYL is used to determine the payload that the aircraft can carry.

NETW stores the time and payload combinations for each base and aircraft. Figures C.3, C.9, C.10, and C.11 have the calling sequence for the programs.

STOCK DATA AND PRIORITY GROUPS

Stock data are input by RDST. Subprogram STLS computes the quantities. Priority group data are input by RDPG.

The calling sequences for these programs are in Figs. C.12, C.13, and C.14. Figure C.15 is for the program that prints stock data.

LOADING METHOD

Initial Sortie for Each Aircraft

The FSDL subprogram reads the type 09 control cards for aircraft arrivals. Its calling sequence is shown in Fig. C.16. It reads one

RDST (NSTL, NVT, NNODES)

Subprogram called by MAIN to read stock data from card type 07 and to create list of available stock.

Input arguments:

NVT	number of vehicles
NNODES	number of nodes (bases)

Output argument:

NSTL	number of stock lists

Fig. C.12—Routine RDST

STLS (IZ, NVT, NNEW)

Subprogram called by RDST or RDPG to store list of vehicles.

Input arguments:

IZ	stock list number
NVT	number of vehicles
NNEW	1 if new stock list 0 if continuation of stock list

Output arguments:

None

Fig. C.13—Routine STLS

RDPG (NVT, ISW, NPGC)

Subprogram called by MAIN to read data in a priority group.

Input arguments:

NVT	number of vehicles
NPGC	priority group number

Output argument:

ISW	card type

Fig. C.14—Routine RDPG

PRPG (NVT, TWT, NPAXPG, IVSP5)

Subprogram called by MAIN to print priority group data.

Input arguments:

NVT	number of vehicles
IVSP5	print control for output of priority group composition

Output arguments:

TWT	cargo weight
NPAXPG	number of personnel

Fig. C.15—Routine PRPG

FSDL (NVT, NNODES, NACT, NSTL, NACF, IWAR)

Subprogram called by MAIN to find first deliveries for the aircraft.

Input arguments:

NVT	number of vehicles
NNODES	number of nodes (bases)
NACT	number of aircraft types
NSTL	number of stock lists
IWAR	offload base number

Output argument:

NACF	total number of aircraft flown

Fig. C.16—Routine FSDL

card and verifies the data. For each aircraft in the group it calls FINL to find the load and time to fly the aircraft. Each type 09 card specifies two flag numbers. A flag number is associated with a stock list and an onload base. The flag numbers used for the initial sortie must be one of the flag numbers in the first priority group entered by card type 08. The program attempts to load the aircraft with vehicles in the list specified by the first of the two flag numbers. Note that both flag numbers must be for the same onload base. Upon return from

FINL, if the aircraft contains a load, it computes the time at which the aircraft is ready for redeployment, which is equal to:

hours before first arrival

+ (number of aircraft arrived less one) multiplied by the time between arrivals

+ time to fly load to offload base and ground time at offload base.

The time in the array ARR and the aircraft number in the array NTARR are recorded.

The program computes the time increment for the output from the time in ARR divided by the hour increment from card type 00 and adds "one" to obtain a subscript for the arrays that accumulate cargo weight, number of personnel flown for the current priority and the total of all priorities, and the number of aircraft available for departure.

It then subtracts the ground time at the offload base from the time in ARR and computes the "arrival" time increment and updates the number of aircraft that arrived. It increases the number of sorties by one.

The process is repeated for each aircraft in the current group. Then the information for the next card type 09 is read, and the cycle repeated until there are no aircraft arriving.

If the aircraft contains no load, a check is made to determine whether the flag number is the first one specified for this aircraft. If yes, the second flag number is used to try to load this aircraft and succeeding aircraft in this group. When the aircraft is empty and the flag number is the second one, the empty aircraft is flown to the offload base. The redeployment time is computed as for a plane with a load. There will be a valid time which will be close to the time for the ferry range.

After all aircraft have been processed, the redeployment array ARR and its associated array NTARR are ordered on ascending time for redeployment.

Sorties Subsequent to Initial One for Each Aircraft

The FINP subprogram (Fig. C.17) creates a table, NPAC for each aircraft type. It shows the flag numbers in the current priority group. The flag numbers in NPAC are arranged in descending order of maximum flow that can be delivered for the aircraft-and-base combination associated with the flag.

FINP (NACT, NSTL)

Subprogram called by MAIN to create a table of priority flags for each aircraft. The table of flags is arranged in descending order of maximum flow.

Input arguments:

NACT	number of aircraft types
NSTL	number of stock lists

Output arguments:

None
The contents of the table created are in the array NPAC

Fig. C.17—Routine FINP

The ADEL subprogram (Fig. C.18) controls the allocation of aircraft for redeployment to onload bases, sets the parameters for the load routines. It maintains (1) the counts for total cargo and personnel delivered for the current priority group and (2) cumulative values for all priority groups. It counts the aircraft that arrive at the offload base in the time increment specified for output. It does the same for aircraft that depart. It updates the number of sorties. It inserts the redeployment time for the aircraft arriving at the offload base into the appropriate position of the ARR array to maintain the ascending order of time.

The program starts by selecting the first entry in NTARR array. This is the aircraft ready for deployment. The first flag is chosen for the aircraft from the NPAC table created by subprogram FINP. The onload base associated with the flag is determined and FINL is called

ADEL (NVT, NACF, IWAR)

Subprogram called by MAIN to select aircraft to load. It calls loading subprograms, then records deliveries for current priority groups.

Input arguments:

NVT	number of vehicles
NACF	total number of aircraft flown
IWAR	offload base

Output arguments:

None

Fig. C.18--Routine ADEL

to load the aircraft. If the aircraft cannot be loaded, the next flag number for the same aircraft is chosen and an attempt again is made to load. If the list of flags for this aircraft and priority group has been exhausted, the program goes to the next aircraft in the NTARR array.

After the aircraft has been loaded and the ARR and NTARR arrays have been adjusted, the next aircraft available is in the current position of the NTARR array.

ADEL continues through the NTARR array until the last aircraft cannot be loaded.

Loading the Aircraft

The FINL subprogram (Fig. C.19) controls (1) finding the load for the aircraft and (2) determining the time to fly the load. If this is the first time that the flag is specified by the input parameter LIST, the maximum payload for the aircraft and base is obtained from the maximum paylcad table in the array WTMV. The LOAD subprogram is called to find the load configuration for the aircraft using the current stock available for the flag in the priority group. The weight loaded will be less than or equal to the maximum payload given to LOAD. Upon return from LOAD, FINL searches the payload table to find the time

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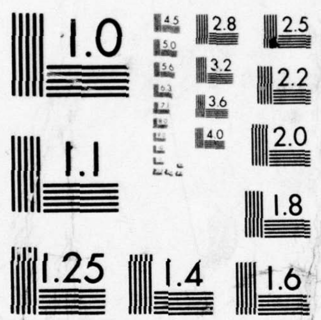

MICROCOPY RESOLUTION TEST CHART

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FINL (NSW, IAC, LIST, NOB, NVT, WTC, NPAX, TTO)

Subprogram called by FSDL or ADEL to find the load for the aircraft and the time to fly it.

Input arguments:

NSW = 1	the first time loading from the flag number stored in LIST
= 0	other times
IAC	aircraft number
LIST	flag number
NOB	base number
NVT	number of vehicles

Output arguments:

WTC	total weight loaded on aircraft, from LOAD
NPAX	number of personnel on aircraft, from LOAD
TTO	time to fly load

Fig. C.19—Routine FINL

it takes to fly the load for the aircraft. It then saves the current aircraft number and flag number.

If this is not the first time that FINL has been called with the flag number, the subprogram checks to see whether the flag and the aircraft are the same as the ones on the previous load. If they are not, the situation is treated as before and a call is set up to LOAD. If the aircraft and flag are the same as before, a check is made to see whether the same configuration can be used. If so, the stock list and the count for the number of times the configuration may be used are adjusted. The time value is still available from the previous load.

If the number of configurations have been used up, the parameters are set and LOAD is called.

Return to the calling program ADEL or FSDL.

The LOAD subprogram (Fig. C.20), called by FINL, determines which vehicles to place on the aircraft at a given onload base, using the flag number specified for the current priority group. It is a requirement that the first vehicle loaded be the widest vehicle from the available stock that will fit into the space considered. The search starts from the left forward position.

LOAD (IAC, PAY, LIST, NVT, WT, NPAX, NSIM, NINA)

Subprogram called by FINL to load the aircraft from the available priority stock list specified.

Input arguments:

IAC	aircraft number
PAY	maximum payload for aircraft and onload base from the payload/time-out table
LIST	flag number for stock list in priority group
NVT	number of vehicles

Output arguments:

WT	total weight loaded on aircraft
NPAX	number of personnel on aircraft
NSIM	number of aircraft of the current type that may be loaded with the same configuration. NSIM = 1000000 if aircraft is empty; NSIM = 0 if more than 50 vehicles loaded. The program keeps the list for only 50 vehicles.
NINA	number of cargo vehicles loaded on aircraft

Fig. C.20—Routine LOAD

The space available for stowing a vehicle is defined by a moving left line XF and a moving right line XT, which represent the distances from the left side of the compartment. The difference between the two expresses the maximum width available at the moment an item is being stowed. The length of the space available for stowing an item of equipment is the difference between the length of the compartment and the line SL. SL marks the momentary forward position at which equipment can be stowed and is the distance of that point from the front of the compartment. The height of the vehicle is checked, and its weight is checked against the unused weight capacity of the aircraft. (The vehicles' dimensions include the required clearances.) Initially, XF = 0, XT = width of compartment, and SL = 0.

When the selection of vehicle is made, the left line XF is recorded in XL, and the right line (XF + width of vehicle) is recorded in XR for that vehicle. The remaining weight and the quantity in the stock list and priority stock list are reduced. In addition, the distance from the front of the aircraft compartment to the end of the stowed vehicle is stored in the STA array. The subscript for XL, XR, STA is recorded in NTL. The order within NTL is such that NTL(I)... NTL(I+n) point to XL values in ascending order. NSAVE records the vehicle number.

Vehicles are stowed side by side until nothing will fit in the row. If there is enough width for passengers, the length of this space is added to the sum of space reserved for passengers up to this point. The rear line of the vehicle preceding the passengers is extended to the right limit of the aircraft.

After a row is completed, the program checks to see whether or not there is a gap (explained below). If there is no gap, search starts for the STA value that is closest to the front of the compartment. This becomes the SL value. For each vehicle that has that same STA value, STA and NTL are set to zero. Then nonzero values are moved up to consecutive positions in NTL.

Figure C.21 illustrates a placement of vehicles that leads to the creation of a gap. After number 4 vehicle is stowed, there is no space against the forward line for a vehicle, but enough space for passengers. The value of XR_4 is changed to equal that of the width of the aircraft and the "passenger space" is assumed to be filled. Since all vehicles are adjacent to one another, no storage space remains available against the forward line; the program, therefore, finds the new most forward line (in the illustration, the line behind vehicles 2 and 3).

A gap exists when one vehicle is no longer adjacent to the last previous vehicle stowed, that is, when the value of the left line XL_i is greater than that of the right line XR_{i-n} of the previous vehicle. In the example of Fig. C.21, vehicles 2 and 3 have the same STA value. Their lines XL_2, XR_2, XL_3, and XR_3 are removed from the list. The NTL array now points to vehicles 1 and 4 only. Since the left line of vehicle 4, XL_4, does not coincide with the right line of vehicle 1, XR_1, a gap exists.

The new space available has a left line equal to XR_1 and a right line equal to XL_4, and SL = STA_2. Vehicle 5 is now stowed. The new NTL list points to vehicles 1, 5, and 4 in ascending order for the XL

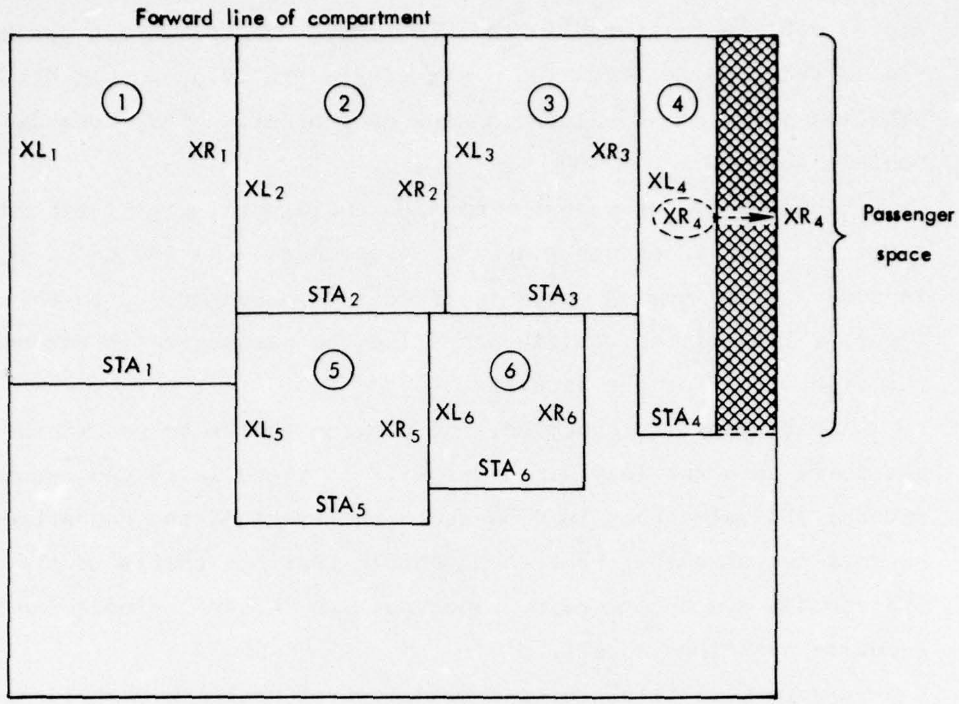

Fig. C.21 — Stowing vehicles

lines. There is still a gap between XR_5 and XL_4. After vehicle 6 is stowed, there are no usable gaps between vehicles 1, 5, 6, and 4. The program extends line STA_4 to the left to XR_6. Vehicle 4 will have XL_4 coincide with XR_6 when the program gets to consider line STA_4.

Now again the most forward line is sought, which is behind vehicle 1, and the process continues.

When nothing more can be loaded, the program calculates the number of passengers from the accumulated passenger spaces. Then it checks the current configuration of vehicles and passengers against the remaining stock to determine the number of aircraft of the same type, at the same base, with the same priority flag that may be loaded with the same configuration.

The internal program list can record only 50 vehicles loaded. If there are more, then a value of zero is returned. If the plane is empty, a value of one million is returned.

Routines PDEL and PCDEL (Figs. C.22 and C.23) print information about deliveries.

PDEL (NVT, TWT, NPAXPG, NPGC, POUT)

Subprogram called by MAIN to print deliveries.

Input arguments:

NVT	number of vehicles
NPGC	priority group number

Output arguments:

TWT	cargo weight
NPAXPG	number of personnel
POUT	array used for printing graph of cargo and personnel

Fig. C.22—Routine PDEL

PCDEL (NVT, WTCT, NPAXT, POUT, NACF, IVSP4, IVSP6, NACT)

Subprogram called by MAIN to print cumulative deliveries for one case.

Input arguments:

NVT	number of vehicles
WTCT	total cargo weight
NPAXT	total number of personnel
NACF	number of aircraft personnel
IVSP4	control for printing aircraft release times
IVSP6	control for printing activity at offload base
NACT	number of aircraft types

Output argument:

POUT	array used for printing graph of cargo and personnel

Fig. C.23—Routine PCDEL

INPUT DATA FORMATS

Overview

Data cards are entered by card type. The beginning of this report has the detailed description of the data. Card formats and program variable names follow.

There must be a blank card between each card type group. If an optional card type has been omitted, a blank card must be inserted. For example, if there are no type 04 cards, the deck would have

Type 02 cards
Blank card
Type 03 cards
Blank card
Blank card
Type 05 cards
.
.
.

Input Card Formats:

1. Title card, card type 00; read by FRST; one card.

Columns	Contents	Variable Name
1-2	00	ISW
3-80	title	(read into format statement)

2. Parameter card, card type 00; read by FRST; one card.

Columns	Contents	Variable Name	Format
1-2	00	ISW	I2
6-10	clearance width	CLW	F5.0
11-15	clearance height	CLH	F5.0
16-20	clearance length	CLL	F5.0
21-25	hours increments, default 12 allows 100 days for printing	HRSINC	F5.0

2. Parameter card continued:

The next 11 fields control optional output

Columns	Contents	Variable Name	Format
26-30	distance table	IVSP1	I5
31-35	vehicle data	IVSP2	I5
36-40	priority group graphs	IVSP3	I5
41-45	aircraft release times	IVSP4	I5
46-50	priority group composition	IVSP5	I5
51-55	activity at offload base	IVSP6	I5
56-60	deliveries for each initial sortie	IVSP7	I5
61-65	deliveries for sortie after all aircraft have made their initial sortie	IVSP8	I5
66-70	available for future use	IVSP9	I5
71-75	available for future use	IVSP10	I5
76-80	available for future use	IVSP11	I5

3. Vehicle data, card type 01; read by FRST; one card per vehicle.

Columns	Contents	Variable Name	Format
1-2	01	ISW	I2
3-4	blank	--	2X
5-10	vehicle name	NAMEV (I)	A6
11-15	vehicle number	NV (I)	I5
16-20	width*	VWD (I)	F5.0
21-25	height*	VHT (I)	F5.0
26-30	length*	VLENG (I)	F5.0
31-36	weight quantity in	VWT (I)	F6.0
37-40	unit 1	NOV (I,1)	I4
41-44	unit 2	NOV (I,2)	
45-48	unit 3	.	.
49-52	unit 4	.	.

*Program adds clearance values from parameter card.

3. Vehicle data continued:

Columns	Contents	Variable Name	Format
53-56	unit 5	NOV (I,5)	I4
57-60	unit 6	.	.
61-64	unit 7	.	.
65-68	unit 8	.	.
69-72	unit 9		
73-76	unit 10		
77-80	unit 11	NOV (I,11)	I4

4. Vehicle lists, card type 02; read by FRST; one to seven cards per list number. One to five list numbers, if any.

Columns	Contents	Variable Name	Format
1-2	02	ISW	I2
3-4	blank	--	2X
5	*list number*	LN	I1
6-10	vehicle number,	NSAVE (1)	I5
11-15	up to 15 per	.	.
.	card *maximum*	.	.
.		.	.
76-80	*of* 100 vehicles	NSAVE (15)	I5

Vehicle numbers get transferred to LISV (LN,J)

These external vehicle numbers are changed to internal numbers; *that is, the subscript* for the vehicle in the vehicle data array NV.

5. Base data, card type 03; read by RDNT; one card per base.

Columns	Contents	Variable Name	Format
1-2	03	ISW	I2
3-4	blank	--	2X
5-10	base name	NAME (I)	A6
11-15	base number	NO (I)	I5
16-20	ground time	GRT (I)	F5.0

5. Base data continued:

Columns	Contents	Variable Name	Format
21-27	latitude degrees*	ZLATD (I)	F7.0
28	blank		IX
29-30	latitude minutes	ZLATM (I)	F2.0
31-37	longitude degrees*	ZLONGD (I)	F7.0
38	blank		1X
39-40	longitude minutes	ZLONGM (I)	F2.0

6. Link data, card type 04; read by RDNT; one card per link, if any.

Columns	Contents	Variable Name	Format
1-2	04	ISW	I2
3-5	blank	--	3X
6-10	base number from	NFR	I5
11-15	base number to	NTO	I5
16-20	distance in nautical miles. Blank if link denied	DISTX	F5.0

7. Offload and onload bases, card type 05; read by NETW; one card per base.

Columns	Contents	Variable Name	Format
1-2	05	ISW	I2
3-5	blank	--	3X
6-10	offload base number	IWAR	I5
11-15, 16-20, . . . 76-80	onload base numbers	NON (I)	14I5

*For negative latitude and/or longitude precede the degrees with a minus sign. For negative latitude and/or longitude with *zero degrees*, use *-360 degrees*.

8. Aircraft type data, card type 06; read by NETW; one card per aircraft type.

Columns	Contents	Variable Name	Format
1-2	06	ISW	I2
3-4	blank	--	2X
5-10	aircraft name	ANAME(IAC)	A6
11-15	aircraft number	ANO(IAC)	F5.0
	Compartment Dimensions		
16-20	width (inches)	AWID(IAC)	F5.0
21-25	height (inches)	AHT(IAC)	F5.0
26-30	length (inches)	ALENG(IAC)	F5.0
31-35	passenger capacity	EPAX(IAC)	F5.0
36-40	speed (knots)	SPEED(IAC)	F5.0
	Ranges (nautical miles)		
41-45	with maximum payload	APAY(IAC,1)	F5.0
46-50	with reduced payload	APAY(IAC,3)	F5.0
51-55	ferry range	APAY(IAC,5)	F5.0
56-63	maximum payload	APAY(IAC,2)	F8.0
64-71	reduced payload	APAY(IAC,4)	F8.0
72-78	ground time per flying hour	GTPFH	F7.0
79-80	number of bases denied	NBDN	I2

9. Base denial cards, card type 06; read by TMBK; as many cards as specified in aircraft type data, card type 06 columns 79-80.

Columns	Contents	Variable Name	Format
1-2	06	--	5X
3-5	blank	--	
6-10, 11-15, . . . 76-80	base number	NSAVE(I)	15I5

10. Stock data, card type 07; read by RDST; one card per request.

Columns	Contents	Variable Name	Format
1-2	07	ISW	I2
3-5	blank		3X
6-10	flag number	NFX	I5
11-15	base number	NBX	I5
16-20	quantity	Q(1)	F5.0
21-25	unit	NU(1)	I5
26-30	±list number	NL(1)	I5

11. First priority group data, card type 08; read by RDPG; one card per request.

Columns	Contents	Variable Name	Format
1-2	08	ISW	I2
3-5	blank		3X
6-7	flag numbers	NFSP (1)	9I2
8-9		NFSP (2)	
10-11		NFSP (3)	
12-13		NFSP (4)	
14-15		NFSP (5)	
16-17		NFSP (6)	
18-19		NFSP (7)	
20-21		NFSP (8)	
22-23		NFSP (9)	
24-30	quantity	Q (1)	F7.0
31-35	unit	NU (1)	I5
36-40	list number	NL (1)	I5

The program transfers flag numbers from NFSP to NF for each card; thus the flag numbers from the last card are preserved.

12. Aircraft arrivals, card type 09; read by FSDL; one card per aircraft group.

Columns	Contents	Variable Name	Format
1-2	09	ISW	I2
3-5	blank		3X
6-10	base number	NBX	I5
11-15	flag number of first stock list	NFX1	I5
16-20	flag number of second stock list	NFX2	I5
21-25	aircraft type (ID number)	NA	I5
26-30	quantity in groups	NQTY	I5
31-35	hours before first arrival	DELT	F5.0
36-40	hours between arrivals	TBA	F5.0

13. Remaining priority group data, card type 10; read by RDPG.

    The card format for the remaining priority groups is the same as for the first priority group data with 10 in columns 1-2.

14. End of case, card type 11; tested in MAIN program. The only information on this card is 11 in columns 1-2.

COMMON VARIABLES

Definitions for COMMON

STA(50): The length from the forward position of the compartment to the end of the stowed vehicle. Used in LOAD. If more than 50 pieces of cargo are loaded, position 50 stores the values.

NTL(50): Pointer to the subscript for arrays XL, XR, STA used to mark the position of a vehicle in the aircraft as stored by LOAD. The pointers are for ascending order in XL.

XL(50): Distance from the left side of the compartment to the left side of a vehicle stored by LOAD.

XR(50): Distance from the left side of the compartment to the right side of a vehicle stored by LOAD. For any vehicle XR(I) = XL(I) + VWD(I).

DIST(50, 50): Distance between two bases, first computed as the great circle distance in RDNT, using longitudes and latitudes entered in card type 03 card. If the type 04 link data card has a distance between links in columns 16-20, it replaces the value in the DIST table. If columns 16-20 are blank, the link value becomes 9,999,999. Subprogram NWLK then computes the shortest distance between all bases. The DIST matrix stores values in its upper triangle only, that is for DIST(I, J) where J > I. For links where J < I, computation uses DIST(J, I). The DIST matrix has been initialized to zero before the calculation of distances.

NSUBN(50, 50): For each base it is the list of bases in the route from onload to offload base for maximum payload for an aircraft. Set in SUBN from array NP computed in MINT.

FILL(250): Never referenced. It is a filler to accommodate the space needed by variable NSTK(16, 200) which is equivalent to DIST(2002).

AHT(10): Compartment height--in columns 21-25 of card type 06. Read by NETW.

ALENG(10): Compartment length--in columns 26-30 of card type 06. Read by NETW.

ANAME(10): Aircraft name--in columns 5-10 of card type 06. Read by NETW.

ANO(10): Aircraft number--in columns 11-15 of card type 06. Read by NETW.

APAY(10, 5): Aircraft ranges and payload. Data in card type 06, read by NETW. The second dimension stores the following for each aircraft:

1. Range with maximum payload, in columns 41-45.
2. Maximum payload, in columns 56-63.
3. Range with reduced payload, in columns 46-50.
4. Reduced payload, in columns 64-70.
5. Ferry range, in columns 51-55.

AWID(10): Compartment width--in columns 16-20 of card type 06. Read by NETW.

EPAX(10): Aircraft passenger capacity--in columns 31-38 of card type 06. Read by NETW.

GRT(50): Base ground time--in columns 16-20 of card type 03. Read by NETW.

JNOW(10): Pointer to second subscript in NPAC(I, J) table for each aircraft. Set to 1 in FINP. Used and modified in ADEL.

LISV(5, 100): Vehicle list of card type 02. Read by FRST.

NAME(50): Base name in columns 5-10 of card type 03. Read by RDNT. (Variable defined as REAL*8.)

NAMEP(50): Base names in maximum flow route. Printed by SBN2. (Variable defined as REAL*8.)

NAMEV(200): Vehicle name in columns 5-10 of card type 01. Read by FRST. (Variable defined as REAL*8.)

NAOTB(10, 50): Pointer into the array WTMV for the start of information for an aircraft-and-base combination. Value set in NETW upon return from SBN2.

NBASE(50): Internal number for the base associated with a stock list and a flag number. It is a pointer to the array NO, which contains the base numbers. Data come from columns 11-15 of card type 07, read by RDST.

NF(9): Flag numbers associated with a priority group, from two column fields in 6-23 in card type 08 or 10. Read by RDPG.

NFLG(50): Flag number for a stock list, from columns 6-10 in card type 07. Read by RDST.

NL(7): The vehicle list number to use in assembling stock. It references a list number entered by card type 02. NL comes from card columns 29-30 in card type 07. Read by RDST.

If NL > 0, the vehicles specified in the vehicle list number are used.
If NL < 0, the vehicles specified in the vehicle list number are excluded.
If NL = 0, all vehicles are used that are required by the unit in card type 07.

NO(50): Base number in columns 11-15 in card type 03. Read by RDNT.

NODE(50): In TMBK it is set to the list of acceptable bases for an aircraft's route. SBN2 stores bases when computing the route out.

NON(50): List of onload bases entered in card type 05, read by NETW.

NOV(200, 11): List of the required quantity of a vehicle in a unit. Data entered in 4 digit fields in columns 37-80 in card type 01, read by FRST.

NP(50): Route determined for minimum time by MINT.

NPAC(10, 50): For each aircraft, the pointers into the stock lists that may be used to load the aircraft after the first deliveries.

NSAVE(50): Used to store information in different subprograms.

NTL1(50): Used as temporary storage in LOAD.

NU(7): Unit number for priority group in columns 31-35 in card type 08 or 10, read by RDPG.

NV(200): Vehicle number in columns 11-15 in card type 01, read by FRST.

Q(7): The quantity that is the multiple of the stock required by the unit NU in the priority group. The value is in columns 24-30 in card type 08 or 10, read by RDPG.

SPEED(10): Speed of the aircraft in knots in columns 36-40 in card type 06, read by NETW.

TB(50): Minimum time back to base from the offload base. SUBN stores values from array TMIN computed by TMBK. In ADEL, the time back for the current base is recomputed using data from the maximum payload table WTMV.

VHT(200): Vehicle height plus clearance height. Vehicle height is in columns 21-25 in card type 01. Clearance height is in 11-15 in card type 00. Both cards read by FRST, which does the addition.

VLENG(200): Vehicle length plus clearance length. Vehicle length is in columns 26-30 in card type 01. Clearance length is in 16-20 in card type 00. Both cards read by FRST, which does the addition.

VWD(200): Vehicle width plus clearance width. Vehicle width is in columns 16-20 in card type 01. Clearance width is in 6-10 in card type 00. Both cards read by FRST, which does the addition.

VWT(200): Vehicle weight in columns 31-36 in card type 01, read by FRST.

WDEL(200): Cargo weight delivered in the current priority group. The subscript is the time increment for printing deliveries. Values are modified in FSDL and ADEL. The array is cleared in LOAD and PDEL after printing.

WTM(50): Array contains pairs of values for payload and for the time to fly a load. WTIM computes the values for one aircraft at distances ranging from ferry range to range for maximum payload. List terminated with -1, if there are fewer than 50 entries.

WTMV(2000): Payload and time out table for an aircraft and onload base combination. The first entry is the maximum flow, computed from maximum payload divided by the sum of time out and time back. Following this are pairs of values where the first is the time to deliver the load. The time includes ground time at the bases enroute to the offload base and the required aircraft ground time. The second is the load. These pairs are in descending order of payload. The last entry for an aircraft/base combination is negative. The array NAOTB contains the subscript for the starting point for the aircraft/base combination. NETW stores the array from WTM.

GTPFH: Ground time per flying hour for aircraft in columns 72-78 in card type 06, read by NETW.

MDEL(200): Personnel delivered in the current priority group. This array is analogous to WDEL for weight delivered.

WDELC(200): Cumulative cargo weight delivered for all priority groups. The subscript is the time increment for printing deliveries.

MDELC(200): Cumulative personnel delivered for all priority groups. This array is analogous to WDELC for cargo.

HRSINC: Hour increment for recording the simulation results for output. The value is in columns 21-25 in card type 00, read by FRST. If the field is blank, the default value is 12. The default allows printing for 100 days of simulation. If more days are needed use a larger increment.

NACARR(200): Number of aircraft that have arrived in a time increment at the offload base.

NACDEP(200): Number of aircraft available for departure from the offload base.

NORMAN(10): Number of sorties for an aircraft.

Definitions for Variables Equivalent to COMMON

FLOW(50): Shares storage with all of STA: Maximum flow computed in SUBN.

NROUT(50): Shares storage with all of NTL. Route back from the offload base to an onload base. Used temporarily in SBN2.

CL(50): Shares storage with all of XL. Set to zero in NWLK. Set to zero and used in MINT to compute the distance in the route for the minimum time network. This distance is used in SUBN for computing the maximum payload.

TMIN(50): Shares storage with all of XR. Used for computation of minimum time routes in MINT.

ARR(1000): Shares storage with DIST(1,1) to DIST(50,20). This array has the time the aircraft is available for redeployment. The array is in ascending sequence for time. The time includes the time back to the onload base.

NTARR(1000): Shares storage with DIST(1,21) to DIST(50,40). This is the aircraft type that is available for redeployment. This array has a one-to-one correspondence with ARR.

NSTK(16,200): Shares storage with DIST(2,41) to DIST(50,50); NSUBN(1,1) to NSUBN(50,50); and FILL(1) to FILL(201). Each row of this matrix is a stock list indicating the available quantity of each vehicle type. Subprogram STLS computes the quantities from the data entered in card types 01, 02, and 07. Array NFLG has the flag number for the row and NBASE has the base that has the stock. Row 16 is used to aggregate quantities for the current priority group.

Definitions for COMMON/LAB01/

IVSP7: Control for the optional output for the initial sortie of each aircraft. Enter a one in column 60 of the card type 00 to print the onload base, the load, and the personnel carried by the aircraft on its first flight to the offload base. Referenced in FRST and FSDL.

IVSP8: Control for the optional output for all sorties of each aircraft after its initial sortie. Enter a one in column 65 of the card type 00 to print the onload base, the load, and the personnel carried to the offload base. Referenced in FRST and ADEL.

IVSP9, IVSP10, IVSP11: Available for additional parameters in card type 00. Use in columns 66-70, 71-75, 76-80. Referenced in FRST.

References to COMMON Variables:

Variables	Routines						
STA	LOAD*						
NTL	LOAD*						
XL	LOAD*						
XR	LOAD*						
DIST	MINT	NWLK*	RDNT*				
NSUBN	SBN2	SUBN*					
FILL							
AHT	LOAD	NETW*					
ALENG	LOAD	NETW*					
ANAME	MAIN	FSDL	NETW*	PCDL			
ANO	FSDL	NETW*					
APAY	NETW*	PAYL	SUBN	WTIM			
AWID	LOAD	NETW*					
EPAX	LOAD	NETW*					
GRT	FSDL	ADEL	MINT	RDNT*			
JNOW	FINP*	ADEL*					
LISV	FRST*	STLS					
NAME	FSDL	NWLK	RDNT*	RDST	SBN2		
NAMEP	SBN2*						
NAMEV	FRST*	PRPG					
NAOTB	FINP	ADEL	FINL	NETW*			
NBASE	FINP	FSDL	ADEL	RDST*			
NF	FINP	RDPG*					
NFLG	FINP	FSDL	RDST*				
NL	RDPG*	RDST*	STLS				
NO	FSDL	NETW	RDNT*	RDST	TMBK		
NODE	MINT	SBN2*	TMBK*				
NON	NETW*	SUBN					
NOV	FRST*	STLS					
NP	MINT*	RDST	SUBN				
NPAC	FINP*	ADEL					
NSAVE	FRST*	FINL	LOAD*	SBN2	SUBN*	TMB*	
NTL1	LOAD*						
NU	RDPG*	RDST*	STLS				
NV	FRST*	PRPG					
Q	RDPG*	RDST*	STLS				
SPEED	NETW*	SUBN	WTIM				
TB	ADEL*	NETW	SBN2	SUBN*			
VHT	FRST*	LOAD	PRPG				
VLENG	FRST*	LOAD	PRPG				
VWD	FRST*	LOAD	PRPG				
VWT	FRST*	FSDL	ADEL	LOAD	PRPG		
WDEL	FSDL*	ADEL*	PDEL*				
WTM	NETW	WTIM*					
WTMV	FINP	ADEL	FINL	NETW*			
GTPFH	MINT	NETW*					
MDEL	FSDL*	ADEL*	PDEL*				
WDELC	FSDL*	ADEL*	PCDEL				
MDELC	FSDL*	ADEL*	PCDEL				
HRSINC	FRST*	FSDL*	ADEL	PCDEL	PDEL		
NACARR	FSDL*	ADEL*	PCDEL				
NACDEP	FSDL*	ADEL*	PCDEL				
NORMAN	MAIN	FSDL*	ADEL*				
FLOW = STA(1)		SUBN*					
NROUT = NTL(1)		SBN2*					
CL = XL(1)		MINT*	NWLK*	SUBN			
TMIN = XR(1)		MINT*	NWLK*	SUBN			
ARR = DIST(1)		FSDL*	ADEL*	PCDEL			
NTARR = DIST(1001)		FSDL*	ADEL*	PCDEL			
NSTK = DIST(2002)		FINL*	LOAD*	PRPG	RDPG	RDST*	STLS*

*Value stored into variable.

PROGRAM MODIFICATIONS

New Options

Subject to the user's control, a new printout is available for the sorties of each aircraft. There is one line of output giving a number, the aircraft, the onload base, total weight aboard, unused weights, cargo weight, and the number of personnel carried.

For initial sorties the above mentioned number is a sequential number within the group of aircraft arriving. For subsequent sorties it is the sortie number.

The initial sorties will be printed out if there is a one in column 60 in the card type 00 parameter card.

The subsequent sorties will be printed out if there is a one in column 65 in the card type 00 parameter card.

This extends the number of optional tables from 6 to 8. Eventually the program could have 11 options by using columns 70, 75, and 80. These are read, but not listed.

Subprogram FSDL computes and prints the initial sorties and ADEL does the same for subsequent sorties.

A labeled common block has been added to ADEL, FRST, and FSDL to store the print control switches.

```
COMMØN/LAB01/IVSP7, IVSP8, IVSP9, IVSP10, IVSP11
```

Program Changes to Correct Problems

Wherever changes have been made, there will be a comment card in the source code with an explanation and a date.

ADEL

REAL*8 AZ,NBZ has been added, since the names of the aircraft and the bases have six characters.

FRST

The read statement and format 111 have been changed to input six more options on the card type 00 parameter card. (This is an addition rather than a correction.)

FSDL

1. REAL*8 AZ,NBZ,ERR has been added since the names of the aircraft, base, and error may have six characters. Currently ERR will have only four characters because it is set by ATHRUZ.
2. Format 101, which was not referenced and was the same as 100, has been removed.
3. Formats 108 and 109 have been changed to double space.
4. For card type 09, if the aircraft identification is incorrect, check the base before printing an error message.
5. Start a new page for each aircraft.

NETW

1. Added format 112 to print message if onload base number in card type 05 is not correct. Program continues as before.
2. In reading card type 05, the program did not check for a limit of 50. If there were more than 42 bases, it would read 56 and destroy the beginning of the NØV array.
3. If the number of onload bases is a multiple of 14, the list will not terminate properly. The program relied on a blank base to signal the end.

Corrections have been made between statements 258 and 260.

PCDEL

The time increment computed is checked by the program to determine whether it is greater than the maximum dimension of 200. If yes, it is set to 200; a message is printed when the table is finished. Other subprograms make the test. This omission in PCDEL caused the program to end abnormally.

RDNT

There has been a change made in format 101, which reads card type 03, to conform to the description of the input. Two checks were inserted for the values of latitude and longitude. If the degrees are negative, the minutes are set negative. Since the IBM 360 and 370 computers store zero as a positive number, a special convention of -360 has to be used for the negative latitude or longitude where the degrees are zero. For example, -0 degrees 40 minutes would be entered as -360 degrees 40 minutes. After the test for negative degrees, the program tests for degrees of 360 and resets to zero.

TMBK

Format 101, which reads the bases denied to an aircraft in card type 06, has been changed. The format was incorrect if more than two bases were denied.

Problems Not Resolved

There may be errors not detected if the user fails to insert a blank card between card types.

In some cases the program stops. In others, if the card type is greater than the previous one, the program continues. This means that the first card of the new type has been read with the wrong format and the data will not be processed.

The following subprograms read data:

FRST	card types	00, 01, 02
RDNT	card types	03, 04
NETW	card types	05, 06
TMBK	card type	06 (bases denied)
RDST	card type	07
RDPG	card type	08 or 10
FSDL	card type	09

In subprogram FINL after statement 300, there is a DO 400 I=1, 30 loop. The assumption is that the maximum flow table will not have more than 30 entries for a base/aircraft combination. If it has more than 30, the duration of the flight will be--erroneously--that of the previous sortie.

In the same loop, there should be a check that the subscript NXX be less than 2000, the dimension of WTMV.

Program FSDL should (but does not) do further checking on the flag numbers. It does not verify that the flag numbers are in the array NF for the current priority group. This could be done after statement 485.

Suggestions for Possible Program Changes

There are two areas in the loading process where computing time might be reduced. The first is in the selection of the cargo vehicle to load. The algorithm chooses the widest vehicle.

a. Arrange the cargo vehicle lists in descending order of width. The user could do this for all type 01 cards after the first one, which must be personnel. It would save program time to rearrange lists.

b. Modify subprogram FRST, which reads the vehicle data. The program would check the order and arrange it in proper sequence.

c. Modify subprogram LOAD in the DO 1250 loop. As soon as a vehicle meets all of the criteria, it would be the best one. It will be as wide or wider than any vehicle following it in the list.

   Insert GO TO 396 ahead of the 1250 CONTINUE statement.

   The tests in statements 1242 to 1245 should be done in a different sequence. Check width VWD first, then length VLENG and height VHT, with weight VWT last. The dimension of the vehicle may be more of a bind than its weight when the program is trying to fit it into an area.

d. In subprogram ADEL, after each sortie, the new redeployment time has to be inserted into the array ARR to maintain the ascending order on time. Statements 690 to 700 compare values. A binary search may be faster.

e. Subprogram FSDL orders ARR, too. However, it does it only once after all planes have arrived with their initial deliveries, so this may not prove unduly inefficient.

f. There are places in the code where an assignment in a DO loop could be done outside of it. The optimizing computer corrects this.

g. The author of the original program appears to have adapted it from a still earlier one. Some local variables are not referenced, or are assigned a value which serves no purpose. An example of the latter is WINDF which is an argument in subprogram MINT.

h. Subprograms PDEL and PCDEL.

   In the print of the graph for deliveries of personnel and cargo, put a heading above the graph to the effect that an asterisk denotes materiel and a dot denotes personnel.

i. Subprogram PCDEL--aircraft availability printout.

   Instead of printing DAY HOUR and repeating values--print the DAY HOUR and a count of the number of aircraft for that period. It would be easier to read.

j. ATHRUZ(A,B).

   This subprogram has been written in assembly language to place the alphanumeric character specified in the second argument in the variable name in the first argument. All of the calls to the program use six characters for the alphanumeric, but the variable is single precision, which means it can hold only four characters.

The calling program then uses an assignment statement to transfer the variable. This subprogram was necessary when the original program was written. It can be replaced by declaring a labeled COMMON with a list of variables that hold the desired alphanumeric characters. Use BLOCK DATA to initialize the values.

Delete each call and change the assignment statement that follows. Some variables should be REAL*8.

ATHRUZ called by FSDL, PCDEL, and PDEL. FSDL uses 'ERROR' which could be a local variable. PCDEL and PDEL use blanks, numeral ones, dots, and asterisks.

Appendix D

PROGRAM LISTING

INTRODUCTION

This appendix contains listings of the main program and the subroutines that constitute the Army Deployment Simulator. The main program and subroutines, compiled and executed on an IBM 370/158 computer, are written primarily in FORTRAN IV. The single exception is the subroutine ATHRUZ, which is written in OS assembly language. The subroutines appear in alphabetical order following the main routine, except for ATHRUZ, which is last.

See Appendix C for the section on "Program Modifications." Note that there are problems that have not been resolved.

```
C         MAIN PROGRAM FOR DEPLOYMENT SIMULATOR
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION POUT(51)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
      DIMENSION  ISTEVE(14342)
      EQUIVALENCE (ISTEVE(1),STA(1))
      DO 500  I= 1,14342
      ISTEVE(I) = 0
  500 CONTINUE
  101 FORMAT (1H 10F12.1 )
  102 FORMAT (1H 25I5 )
  103 FORMAT (16H1 TOTAL SORTIES    )
  104 FORMAT (34H0 AIRCRAFT      NUMBER OF SORTIES     )
  105 FORMAT (1H0 2X, A6,I10)
  106 FORMAT (I2)
      CALL ERRSET(209,256,-1,1)
      CALL FRST(NVT,IVSP1,IVSP2,IVSP3,IVSP4,IVSP5,IVSP6)
      CALL NETW(IWAR,NACT,NNODES,IVSP1)
  150 NPGC = 1
      NPAXT = 0
      WTCT = 0.0
      CALL RDST(NSTL,NVT,NNODES)
      CALL RDPG (NVT,ISW,NPGC)
      CALL PRPG(NVT,TWT,NPAXPG,IVSP5)
      NPAXT = NPAXT + NPAXPG
      WTCT = WTCT + TWT
      CALL FSDL (NVT,NNODES,NACT,NSTL,NACF,IWAR)
      CALL FINP (NACT, NSTL)
      CALL ADEL(NVT,NACF,IWAR)
      IF (IVSP3) 200,200,180
  180 CALL PDEL(NVT,TWT,NPAXPG,NPGC,POUT)
```

```
200   NPGC = NPGC + 1                                             MAIN0570
      CALL RDPG (NVT,ISW,NPGC)                                    MAIN0580
      IF (ISW - 11) 210,300,210                                   MAIN0590
210   CALL PRPG (NVT,IWT,NPAXPG,IVSP5)                            MAIN0600
      NPAXT = NPAXT + NPAXPG                                      MAIN0610
      WTCT = WTCT + IWT                                           MAIN0620
      CALL FINP (NACT, NSTL)                                      MAIN0630
      CALL ADEL (NVT,NACP,IWAR)                                   MAIN0640
      IF (IVSP3) 200,200,220                                      MAIN0650
220   CALL PDEL (NVT,IWT,NPAXPG,NPGC,POUT)                        MAIN0660
      GO TO 200                                                   MAIN0670
300   CALL PCDEL (NVT,WTCT,NPAXT,POUT,NACP,IVSP4,IVSP6,NACT)      MAIN0680
      WRITE (6,103)                                               MAIN0690
      WRITE (6,104)                                               MAIN0700
      DO 350 K = 1,NACT                                           MAIN0710
350   WRITE (6,105) ANAME(K),NORMAN(K)                            MAIN0720
      READ (5,106,END=12345)                                      MAIN0730
      GO TO 150                                                   MAIN0740
12345 CALL EXIT                                                   MAIN0750
      STOP                                                        MAIN0760
      END                                                         MAIN0770
```

```
CADEL     SUBROUTINE TO LOAD AIRCRAFT AND RECORD DELIVERIES
      SUBROUTINE ADEL (NVT,NACP,IWAR)
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
C
C-->       ADD LABELED COMMON TO HOLD 5 MORE PRINT SWITCHES   6/12/75
      COMMON /LAB01/ IVSP7,IVSP8,IVSP9,IVSP10,IVSP11
C
C-->       ADDED THE FOLLOWING          6/12/75
      REAL*8  AZ, NBZ
C
C
C-->       110 & 111 FORMATS ADDED       6/12/75
  110 FORMAT (// 1H ,29X,9H   TOTAL  /
     1  11X, 6HAIR   ,3X, 6HONLOAD,3X, 9H   WEIGHT,3X, 9H UNUSED  ,3X,
     2   9H   CARGO ,3X, 9HNUMBER OF /
     3  11X, 6HCRAFT ,3X, 6HBASE  ,3X, 9H   LOADED,3X, 9HCAPACITY ,3X,
     2   9H   WEIGHT,3X, 9HPERSONNEL / )
  111 FORMAT (1H ,I7,3X,A6,3X,A6,3F12.1,I12)
      NSW = 1
      NLDG = 1
C
C-->       SET FOR PRINTING DELIVERIES IF IVSP7 NOT ZERO   6/12/75
C-->       INTITIALIZE THE NUMBER OF SORTIES
      IF (IVSP8.EQ.0) ASSIGN 5450 TO KSWP
      IF (IVSP8.NE.0) ASSIGN 5410 TO KSWP
      ASSIGN 5420 TO KSWH
      NSORTY = 0
      DO 50 K=1,10
      NSORTY = NSORTY + NORMAN(K)
   50 CONTINUE
```

```
  120 IAC = NTARR(NLDG)
  130 JX = JNOW(IAC)
      IF (JX - 50) 150,150,200
  150 LIST = NPAC(IAC,JX)
      IF (LIST) 200, 200, 250
  200 NLDG = NLDG + 1
      IF (NLDG - NACP) 120,120,225
  225 RETURN
  250 NOB = NBASE(LIST)
C
C-->         STORE NAME OF A/C AND BASE          6/12/75
      AZ = ANAME(IAC)
      NBZ = NAME(NOB)
      WTMAX = APAY(IAC,2)
      CALL PINL(NSW,IAC,LIST,NOB,NVT,WTC,NPAX,TTO)
      ZNPAX = NPAX
      WTCC = WTC - ZNPAX * VWT(1)
      NSW = 0
      IF (WTC) 300,300,400
  300 JNOW (IAC) = JNOW(IAC) + 1
      GO TO 130
  400 NPL = NADTB(IAC,NOB)
C
C-->         CHECK FOR PRINTING DELIVERIES & HEADINGS      6/12/75
      GO TO KSWP, (5410,5450)
 5410 GO TO KSWH, (5420,5430)
C
C            PRINT HEADINGS
 5420 ASSIGN 5430 TO KSWH
      WRITE (6,110)
 5430 WDELTA = WTMAX - WTC
      NSORTY = NSORTY+1
      WRITE (6,111) NSORTY,AZ,NBZ,WTC,WDELTA,WTCC,NPAX
C
C-->         JUMP HERE TO BYPASS PRINTING        6/12/75
 5450 CONTINUE
      IF (WTMV(NPL+2) ) 405,410,410
  405 TB(1)= - WTMV(NPL+2)/WTMV(NPL) - WTMV(NPL+1)
      GO TO 420
  410 TB(1)= WTMV(NPL+2) / WTMV(NPL) - WTMV(NPL+1 )
  420 TX = TB(1)+ TTO + ABR(NLDS)
      NDT = (TX / HRSINC) + 1.0
      IF (NDT - 200) 560,560,550
  550 NDT = 200
  560 WDEL(NDT) = WDEL(NDT) + WTCC
      NORMAN(IAC) = NORMAN(IAC) +1
      WDELC(NDT) = WDELC(NDT) + WTCC
      MDEL(NDT) = MDEL(NDT) + NPAX
      MDELC(NDT) = MDELC(NDT) + NPAX
      NACDEP (NDT) = NACDEP(NDT) + 1
      TXMB = TX - GRT (IWAR)
      NDTB = (TIMB / HRSINC) + 1.
      IF (NDTB - 200) 565,565,564
  564 NDTB = 200
  565 NACARR(NDTB) = NACARR(NDTB) + 1
      NLDP = NLDG + 1
      IF (NLDP - NACP) 690,670,680
```

```
670  IF (TX - ARR(NLDP) ) 671,671,672                                        ADEL1140
671  ARR(NLDG) = TX                                                          ADEL1150
     GO TO 900                                                               ADEL1160
672  ARR(NLDG) = ARR(NLDP)                                                   ADEL1170
     NTARR(NLDG) = NTARR(NLDP)                                               ADEL1180
     ARR(NLDP) = TX                                                          ADEL1190
     NTARR(NLDP) = IAC                                                       ADEL1200
     GO TO 900                                                               ADEL1210
680  ARR(NLDG) = TX                                                          ADEL1220
     GO TO 900                                                               ADEL1230
690  DO 700 I = NLDP, NACF                                                   ADEL1240
     IF (ARR(I) - TX) 700,700,750                                            ADEL1250
700  CONTINUE                                                                ADEL1260
     IX = NACF - 1                                                           ADEL1270
     GO TO 770                                                               ADEL1280
750  IF (I - NLDP) 671,671,752                                               ADEL1290
752  IX = I - 2                                                              ADEL1300
770  DO 800 K = NLDG, IX                                                     ADEL1310
     ARR(K) = ARR(K+1 )                                                      ADEL1320
800  NTARR(K) = NTARR(K+1 )                                                  ADEL1330
     ARR(IX + 1 ) = TX                                                       ADEL1340
     NTARR(IX + 1 ) = IAC                                                    ADEL1350
900  GO TO 120                                                               ADEL1360
     END                                                                     ADEL1370
```

```
CFINL     SUBROUTINE TO FIND LOAD AND TIME                                   FINL0010
      SUBROUTINE FINL(NSW,IAC,LIST,NOB,NVT,WTC,NPAX,TTO )                    FINL0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)     FINL0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),       FINL0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),     FINL0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),      FINL0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),            FINL0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)     FINL0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),      FINL0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                      FINL0100
     8 ,MDEL(200),WDELC(200),MDELC(200)                                      FINL0110
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                           FINL0120
      DIMENSION FILL(250)                                                    FINL0130
      REAL*8 ANAME,NAME,NAMEV                                                FINL0140
      REAL*8  NAMEP                                                          FINL0150
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                        FINL0160
      COMMON FILL                                                            FINL0170
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID              FINL0180
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP             FINL0190
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL                FINL0200
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC              FINL0210
      COMMON NSAVE, NTL1,NU,NV,Q                                             FINL0220
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT               FINL0230
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL              FINL0240
      COMMON  WDELC  , MDELC  , HRSINC                                       FINL0250
      COMMON NACARR,NACDEP,NORMAN                                            FINL0260
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),          FINL0270
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),             FINL0280
     2 (DIST(2002),NSTK(1))                                                  FINL0290
      IF (NSW) 104,104,199                                                   FINL0300
  104 IF (IAC - IACL) 199,105,199                                            FINL0310
  105 IF (LIST - LISTL) 199,106,199                                          FINL0320
  106 IF (NSIM) 199,199,107                                                  FINL0330
  107 IF (NINA) 115, 115, 108                                                FINL0340
  108 DO 110 K = 1, NINA                                                     FINL0350
      NSP = NSAVE(K)                                                         FINL0360
      NSTK(LIST,NSP) = NSTK(LIST,NSP) - 1                                    FINL0370
  110 NSTK(16,NSP) = NSTK(16,NSP) - 1                                        FINL0380
  115 NSTK(LIST,1)= NSTK(LIST,1) - NPAX                                      FINL0390
      NSTK(16,1) = NSTK(16,1) - NPAX                                         FINL0400
      NSIM = NSIM - 1                                                        FINL0410
      GO TO 500                                                              FINL0420
  199 NPL = NAOTB(IAC, NOB)                                                  FINL0430
      PAY = WTMV(NPL + 2 )                                                   FINL0440
      IF (PAY) 200,300,300                                                   FINL0450
  200 PAY = - PAY                                                            FINL0460
  300 CALL LOAD(IAC,PAY,LIST,NVT,WTC,NPAX,NSIM,NINA)                         FINL0470
      DO 400 I = 1, 30                                                       FINL0480
      NXX = NPL + 2 * I                                                      FINL0490
      WTB = WTMV(NXX)                                                        FINL0500
      IF (WTC - WTB) 400,390,385                                             FINL0510
  385 IF (WTB) 387,387,386                                                   FINL0520
  386 TTO = WTMV(NXX - 3 )                                                   FINL0530
      GO TO 450                                                              FINL0540
  387 IF (WTC + WTB) 390,390,386                                             FINL0550
  390 TTO = WTMV (NXX - 1 )                                                  FINL0560
```

```
      GO TO 450                                                         PINL0570
400   CONTINUE                                                          PINL0580
450    IACL = IAC                                                       PINL0590
      LISTL = LIST                                                      PINL0600
500   RETURN                                                            PINL0610
      END                                                               PINL0620
```

```
CFINP       SUBROUTINE TO FILL IN NPAC TABLE                               FINP0010
      SUBROUTINE FINP(NACT,NSTL)                                           FINP0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)  FINP0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),    FINP0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),  FINP0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),   FINP0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),         FINP0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)  FINP0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),   FINP0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                   FINP0100
     8 ,MDEL(200),WDELC(200),MDELC(200)                                   FINP0110
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                        FINP0120
      DIMENSION FILL(250)                                                 FINP0130
      REAL*8 ANAME,NAME,NAMEV                                             FINP0140
      REAL*8  NAMEP                                                       FINP0150
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                     FINP0160
      COMMON FILL                                                         FINP0170
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID          FINP0180
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP         FINP0190
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL            FINP0200
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC          FINP0210
      COMMON NSAVE, NTL1,NU,NV,Q                                          FINP0220
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT           FINP0230
      COMMON  WDEL   , WTM    , WTMV   , GTPPH           , MDEL          FINP0240
      COMMON  WDELC  , MDELC  , HRSINC                                    FINP0250
      COMMON NACARR,NACDEP,NORMAN                                         FINP0260
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),       FINP0270
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),          FINP0280
     2 (DIST(2002),NSTK(1))                                               FINP0290
      DO 200 IAC = 1, NACT                                                FINP0300
      J = 1                                                               FINP0310
      DO 180 L = 1, NSTL                                                  FINP0320
      DO 170 K = 1,9                                                      FINP0330
      IF (NF(K) - NFLG(L) ) 170,175,170                                   FINP0340
  170 CONTINUE                                                            FINP0350
      GO TO 180                                                           FINP0360
  175 NPAC(IAC,J) = L                                                     FINP0370
      J = J + 1                                                           FINP0380
  180 CONTINUE                                                            FINP0390
      NENT = J - 1                                                        FINP0400
      IF (NENT - 1 ) 195,195,181                                          FINP0410
  181 NX = 0                                                              FINP0420
      DO 190 KZ = 2, NENT                                                 FINP0430
      L1 = NPAC(IAC,KZ - 1)                                               FINP0440
      L2 = NPAC(IAC,KZ)                                                   FINP0450
      NO1 = NBASE(L1)                                                     FINP0460
      NO2 = NBASE(L2)                                                     FINP0470
      NPL1 = NAOTB(IAC,NO1)                                               FINP0480
      NPL2 = NAOTB(IAC,NO2)                                               FINP0490
      FLOW1 = WTMV(NPL1)                                                  FINP0500
      FLOW2 = WTMV(NPL2)                                                  FINP0510
      IF (FLOW1 - FLOW2) 185,190,190                                      FINP0520
  185 NSP = NPAC(IAC,KZ - 1 )                                             FINP0530
      NPAC(IAC,KZ- 1) = NPAC(IAC,KZ)                                      FINP0540
      NPAC(IAC,KZ) = NSP                                                  FINP0550
      NX = 1                                                              FINP0560
```

```
190   CONTINUE                                                 FINP0570
      IF (NX) 195,195,181                                      FINP0580
195   JNOW (IAC) = 1                                           FINP0590
      IF (NENT - 50) 196,200,200                               FINP0600
196   NPAC(IAC,NENT+1) = - 1                                   FINP0610
200   CONTINUE                                                 FINP0620
      RETURN                                                   FINP0630
      END                                                      FINP0640
```

```
CFRST       SUBROUTINE TO READ FIRST THREE CLASSES OF DATA               FRST0010
      SUBROUTINE FRST(NVT,IVSP1,IVSP2,IVSP3,IVSP4,IVSP5,IVSP6)          FRST0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)FRST0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),  FRST0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),FRST0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50), FRST0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),       FRST0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)FRST0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200), FRST0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                 FRST0100
     8 ,MDEL(200),WDELC(200),MDELC(200)                                 FRST0110
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                      FRST0120
      DIMENSION FILL(250)                                               FRST0130
      REAL*8 ANAME,NAME,NAMEV                                           FRST0140
      REAL*8  NAMEP                                                     FRST0150
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                   FRST0160
      COMMON FILL                                                       FRST0170
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID         FRST0180
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP        FRST0190
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL           FRST0200
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC         FRST0210
      COMMON NSAVE, NTL1,NU,NV,Q                                        FRST0220
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT          FRST0230
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL         FRST0240
      COMMON  WDELC  , MDELC  , HRSINC                                  FRST0250
      COMMON NACARR,NACDEP,NORMAN                                       FRST0260
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),     FRST0270
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),        FRST0280
     2 (DIST(2002),NSTK(1))                                             FRST0290
C                                                                       FRST0300
C-->        ADD LABELED COMMON TO HOLD 5 MORE PRINT SWITCHES   6/12/75  FRST0310
      COMMON /LAB01/ IVSP7,IVSP8,IVSP9,IVSP10,IVSP11                    FRST0320
C                                                                       FRST0330
  100 FORMAT (80H                                                       FRST0340
     1                                                           )      FRST0350
  101 FORMAT(I2,2X,A6,I5,3F5.0,F6.0,11I4 )                              FRST0360
  102 FORMAT (19H0      VEHICLE DATA     )                              FRST0370
  103 FORMAT (119H0  NAME    NUMBER  WIDTH   HEIGHT   LENGTH    WEIGHT   UNFRST0380
     1. 1 UN. 2 UN. 3 UN. 4 UN. 5 UN. 6 UN. 7 UN. 8 UN. 9 UN.10 UN.11  )FRST0390
  104 FORMAT (2X,A6,I7,3F8.1,F10.1,2X,11I6 )                            FRST0400
  105 FORMAT (I2,2X,I1,15I5 )                                           FRST0410
  106 FORMAT (8H0  LIST  I1, 43H REJECTED - NUMBER MUST BE BETWEEN 1 ANDFRST0420
     1 5       )                                                        FRST0430
  107 FORMAT(15H0  VEHICLE LIST I2,33H INCLUDES THE FOLLOWING VEHICLES )FRST0440
  108 FORMAT (1H 20I6 )                                                 FRST0450
  109 FORMAT (1H1 )                                                     FRST0460
  110 FORMAT (43H0PROGRAM STOPPED - DATA CARDS OUT OF ORDER     )       FRST0470
C                                                                       FRST0480
C-->        CHANGE FORMAT TO ALLOW FOR 11 PRINT SWITCHES     6/12/75    FRST0490
C-111 FORMAT (I2,3X,4F5.0,6I5)                                          FRST0500
  111 FORMAT (I2,3X,4F5.0,11I5)                                         FRST0510
  112 FORMAT (                                      38H0 CLEARANCE REFRST0520
     1QUIREMENTS --    WIDTH - F5.1,11H  HEIGHT - F5.1,11H  LENGTH - F5.1FRST0530
     2  )                                                               FRST0540
C     READ TITLE                                                        FRST0550
  190 READ (5,100,END=12345)                                            FRST0560
```

```
      WRITE (6,109)                                                     FRST0570
      WRITE (6,100)                                                     FRST0580
C                                                                       FRST0590
C-->        ALLOW 11 PRINT SWITCHES ON CARD      6/12/75                FRST0600
      READ (5,111)ISW,CLW,CLH,CLL,HRSINC,IVSP1,IVSP2,IVSP3,IVSP4,IVSP5, FRST0610
     1 IVSP6,IVSP7,IVSP8,IVSP9,IVSP10,IVSP11                            FRST0620
      IF (HRSINC) 230,230,235                                           FRST0630
  230 HRSINC = 12.0                                                     FRST0640
  235 IF (ISW) 240,240,999                                              FRST0650
  240 WRITE (6,112) CLW,CLH,CLL                                         FRST0660
      READ (5,111)ISW                                                   FRST0670
      IF (IVSP2) 260,260,250                                            FRST0680
  250 WRITE (6,102)                                                     FRST0690
      WRITE (6,103)                                                     FRST0700
C     READ VEHICLE DATA                                                 FRST0710
  260 DO 300 I = 1,200                                                  FRST0720
      READ (5,101)ISW,NAMEV(I),NV(I),VWD(I),VHT(I),VLENG(I), VWT(I), (NOFRST0730
     1V(I,J),J=1,11)                                                    FRST0740
      IF (ISW - 1) 350,281,350                                          FRST0750
  281 IF (I - 1) 285,279,285                                            FRST0760
  285 VWD(I) = VWD(I) + CLW                                             FRST0770
      VHT(I) = VHT(I) + CLH                                             FRST0780
      VLENG(I) = VLENG(I) + CLL                                         FRST0790
  279 IF (IVSP2) 300,300,280                                            FRST0800
  280 WRITE (6,104)NAMEV(I), NV(I), VWD(I), VHT(I),VLENG(I) ,VWT(I), (NOFRST0810
     1V(I,J),J=1,11)                                                    FRST0820
  300 CONTINUE                                                          FRST0830
      NVT = 200                                                         FRST0840
      READ (5,101)ISW                                                   FRST0850
      GO TO 400                                                         FRST0860
  350 NVT = I - 1                                                       FRST0870
C     READ VEHICLE LISTS                                                FRST0880
  400 LNL = 0                                                           FRST0890
      DO 404 I = 1,5                                                    FRST0900
      DO 404 J = 1, 100                                                 FRST0910
  404 LISV(I,J) = 0                                                     FRST0920
  405 READ (5,105)ISW, LN, (NSAVE(I), I = 1, 15 )                       FRST0930
      IF (ISW - 2) 450,406,450                                          FRST0940
  406 IF (LN) 499, 499, 407                                             FRST0950
  407 IF (LN - 5 ) 410, 410, 499                                        FRST0960
  499 WRITE (6,106)LN                                                   FRST0970
      GO TO 405                                                         FRST0980
  410 IF (LN - LNL) 420,430,420                                         FRST0990
  420 DO 425 I = 1, 15                                                  FRST1000
  425 LISV(LN,I) = NSAVE(I)                                             FRST1010
      IB = 16                                                           FRST1020
      LNL = LN                                                          FRST1030
      GO TO 405                                                         FRST1040
  430 IF (IB - 91 ) 435,436,405                                         FRST1050
  435 IN = 15                                                           FRST1060
      GO TO 440                                                         FRST1070
  436 IN = 10                                                           FRST1080
  440 DO 445 I = 1, IN                                                  FRST1090
      IX = IB + I - 1                                                   FRST1100
  445 LISV(LN, IX) = NSAVE(I)                                           FRST1110
      IB = IX + 1                                                       FRST1120
      GO TO 405                                                         FRST1130
```

```
C       PRINT VEHICLE LISTS                                              FRST1140
  450   IF (IVSP2) 470,470,454                                           FRST1150
  454   WRITE (6,109)                                                    FRST1160
        DO 460 I = 1,5                                                   FRST1170
        DO 451 J = 1, 100                                                FRST1180
        IF (LISV(I,J) ) 452,452,451                                      FRST1190
  451   CONTINUE                                                         FRST1200
        JMAX = 100                                                       FRST1210
        GO TO 453                                                        FRST1220
  452   JMAX = J - 1                                                     FRST1230
        IF (JMAX) 460,460,453                                            FRST1240
  453   WRITE (6,107) I                                                  FRST1250
        WRITE (6,108) (LISV(I,K) ,K = 1,JMAX)                            FRST1260
  460   CONTINUE                                                         FRST1270
C       CONVERT VEHICLE LISTS TO INTERNAL VEHICLE NUMBERS                FRST1280
  470   DO 490 I = 1, 5                                                  FRST1290
        IX = 1                                                           FRST1300
        DO 480 J =1,100                                                  FRST1310
        IF (LISV(I,J) ) 482,482,475                                      FRST1320
  475   DO 478 K = 1,200                                                 FRST1330
        IF (NV(K) - LISV(I,J) ) 478,479,478                              FRST1340
  478   CONTINUE                                                         FRST1350
        GO TO 480                                                        FRST1360
  479   LISV(I,IX) = K                                                   FRST1370
        IX = IX + 1                                                      FRST1380
  480   CONTINUE                                                         FRST1390
        GO TO 490                                                        FRST1400
  482   LISV(I,IX)= -1                                                   FRST1410
  490   CONTINUE                                                         FRST1420
  500   RETURN                                                           FRST1430
  999   WRITE (6,110)                                                    FRST1440
12345   CALL EXIT                                                        FRST1450
        RETURN                                                           FRST1460
        END                                                              FRST1470
```

```
CFSDL     SUBROUTINE TO COMPUTE FIRST DELIVERIES
      SUBROUTINE FSDL (NVT,NNODES.NACT,NSTL,NACF,IWAR)
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NP(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NP     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)), (NTL(1),NROUT(1)), (XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
C
C-->        ADD LABELED COMMON TO HOLD 5 MORE PRINT SWITCHES   6/12/75
      COMMON /LAB01/ IVSP7,IVSP8,IVSP9,IVSP10,IVSP11
C
C-->        CHANGED THE FOLLOWING TO REAL*8 5/29/75
      REAL*8  AZ, NBZ, ERR
C
  100 FORMAT (20H1 AIRCRAFT ARRIVALS      )
C
C-->        FORMAT 101 NEVER REFERENCED.  SAME AS 100    6/12/75
C-101 FORMAT(20H1 AIRCRAFT ARRIVALS      )
  102 FORMAT (79H0 BASE   FLAGS  AIRCRAFT TYPE     QUANTITY    TIME BEFOR
     1E FIRST     TIME BETWEEN          )
  103 FORMAT (1H0A6,2I4,4X,A6,4X,I13,F21.2,F16.2 )
  104 FORMAT (I2,3X,5I5, 2F5.0 )
  105 FORMAT(55H ABOVE AIRCRAFT REJECTED - BASE, A/C OR FLAG NOT INPUT )
  106 FORMAT(50H0 PROGRAM STOPPED - MORE THAN 1000 AIRCRAFT INPUT      )
  107 FORMAT(1H 10X,I10,44H AIRCRAFT LOADED FROM LIST WITH FLAG NUMBER
     1 I5 )
C
C-->        CHANGE FORMATS 108 109 TO DOUBLE SPACE     6/12/75
  108 FORMAT (1H0, 10X, I10, 20H AIRCRAFT FLY EMPTY  )
  109 FORMAT(1H0, 15X,
     1   49H  ALL AIRCRAFT LOADED FROM LIST WITH FLAG NUMBER ,I5)
C
C-->        110 & 111 FORMATS ADDED        6/12/75
  110 FORMAT (// 1H ,29X,9H   TOTAL  /
```

```
     1  11X, 6HAIR   ,3X, 6HONLOAD,3X, 9H   WEIGHT,3X, 9H UNUSED  ,3X,
     2   9H   CARGO ,3X, 9HNUMBER OF /
     3  11X, 6HCRAFT ,3X, 6HBASE  ,3X, 9H   LOADED,3X, 9HCAPACITY ,3X,
     2   9H   WEIGHT,3X, 9HPERSONNEL / )
  111 FORMAT (1H ,I7,3X,A6,3X,A6,3F12.1,I12)
      CALL ATHRUZ (Q000HL,6HERROR )
      ERR = (+Q000HL)
C
C-->        START NEW PAGE FOR EACH A/C   6/12/75
C-->  WRITE (6,100)
C-->  WRITE (6,102)
      NSW = 1
      IX = 1
      DO 120 IPG = 1,200
      MDEL(IPG) = 0
      WDELC(IPG) = 0.0
      MDELC(IPG) = 0
      NACDEP(IPG) = 0
      NACARR(IPG) = 0
  120 WDEL(IPG) = 0.0
      DO 130 IPG = 1,10
  130 NORMAN(IPG) = 0
C
C-->        SET FOR PRINTING DELIVERIES IF IVSP7 NOT ZERO   6/12/75
      IF (IVSP7.EQ.0) ASSIGN 5450 TO KSWP
      IF (IVSP7.NE.0) ASSIGN 5410 TO KSWP
C
  140 READ (5,104)ISW,NBX,NFX1,NFX2,NA,NQTY,DELT,TBA
      NSS = 0
      IF (ISW - 9 ) 150,200,150
  150 NSP = 0
      NACP = IX - 1
      DO 160 K = 2, NACP
      IF (ARR(K-1) - ARR(K) ) 160,160,155
  155 ASP = ARR(K-1)
      ARR(K-1) = ARR(K)
      ARR(K) = ASP
      NSP = 1
      NTSP = NTARR(K-1)
      NTARR(K-1) = NTARR(K)
      NTARR(K) = NTSP
  160 CONTINUE
      IF (NSP) 180,180,150
  180 RETURN
C
C-->        EJECT TO NEW PAGE FOR EACH A/C      6/12/75
C-200 IF (NBX) 140,140,201
  200 WRITE (6,100)
      WRITE (6,102)
  201 DO 350 I = 1, NACT
      ANA = NA
      IF (ANA - ANO(I) ) 350,360,350
  350 CONTINUE
      AZ = ERR
C
C-->        GET BASE NAME BEFORE PRINTING A/C ERROR   6/12/75
C-->  GO TO 260
```

```
      GO TO 245
 360  IAC = I
      AZ = ANAME(IAC)
  245 DO 250 I = 1, NNODES
      IF (NO(I) - NBX) 250,280,250
 250  CONTINUE
      NBZ = ERR
 260  WRITE (6,103) NBZ,NFX1,NFX2,AZ,NQTY,DELT,TBA
      WRITE (6,105)
      GO TO 140
 280  NBX = I
      NBZ = NAME(I)
C
C-->        CHECK IF THERE WAS AN ERROR IN A/C INDEX        6/12/75
      IF (AZ.EQ.ERR) GO TO 260
      IF (NBX - IWAR) 439,300,439
 300  WRITE (6,103) NBZ,NFX1,NFX2,AZ,NQTY,DELT,TBA
      DO 349 I = 1, NQTY
      ZI = I - 1
      ARR(IX) = DELT + ( ZI * TBA ) + GRT(IWAR)
      NTARR(IX) = IAC
      NDT = ( ARR(IX) / HRSINC) + 1.0
      IF ( NDT - 200) 340,340,335
 335  NDT = 200
 340  NACDEP(NDT) = NACDEP(NDT) + 1
      TXMB = ARR(IX) - GRT(IWAR)
      NDTB = ( TXMB/HRSINC) + 1.
      IF ( NDTB - 200) 342,342,341
 341  NDTB = 200
 342  NACARR(NDTB) = NACARR(NDTB) + 1
      IF ( IX - 1000) 345,345,570
 345  IX = IX + 1
 349  CONTINUE
      GO TO 140
 439  DO 450 I = 1, NSTL
      IF (NBASE(I) - NBX) 450,440,450
 440  IF (NFLG(I) - NFX1) 450,470,450
 450  CONTINUE
      GO TO 260
 470  LIST1 = I
      DO 480 I = 1, NSTL
      IF (NBASE(I) - NBX) 480,475,480
 475  IF (NFLG(I) - NFX2) 480,485,480
 480  CONTINUE
      GO TO 260
 485  LIST2 = I
      NBEG = 0
      LIST = LIST1
      WRITE (6,103) NBZ,NFX1,NFX2,AZ,NQTY,DELT,TBA
      NOB = NBASE(LIST)
      NJF=0
      NDS = 0
C
C-->        SET SWITCH TO PRINT HEADINGS; STORE MAXLOAD   6/12/75
      ASSIGN 5420 TO KSWH
      WTMAX = APAY(IAC,2)
      DO 600 I = 1,NQTY
```

```
  505 CALL FINL(NSW,IAC,LIST,NOB,NVT,WTC,NPAX,TTO)                       FSDL1710
      ZNPAX = NPAX                                                       FSDL1720
      WTCC = WTC - ZNPAX * VWT(1)                                        FSDL1730
      IF (WTC) 510,510,540                                               FSDL1740
  510 IF (NJT)520,515,520                                                FSDL1750
  515 NLDED = I - 1 - NBEG                                               FSDL1760
      NBEG = I - 1                                                       FSDL1770
      NSW = 1                                                            FSDL1780
      NJT=1                                                              FSDL1790
      LIST = LIST2                                                       FSDL1800
      NOB = NBASE(LIST)                                                  FSDL1810
      WRITE (6,107)NLDED, NPX1                                           FSDL1820
      ASSIGN 5420 TO KSWH                                                FSDL1830
      GO TO 505                                                          FSDL1840
  520 IF (NDS) 521,521,540                                               FSDL1850
  521 NDS = 1                                                            FSDL1860
      NLDED = I - 1 - NBEG                                               FSDL1870
      WRITE (6,107)NLDED, NPX2                                           FSDL1880
      NSS = 1                                                            FSDL1890
      NEM = NQTY - I + 1                                                 FSDL1900
      WRITE (6,108)NEM                                                   FSDL1910
      ASSIGN 5420 TO KSWH                                                FSDL1920
  540 NSW = 0                                                            FSDL1930
C                                                                        FSDL1940
C-->         CHECK FOR PRINTING DELIVERIES & HEADINGS        6/12/75     FSDL1950
      GO TO KSWP, (5410,5450)                                            FSDL1960
 5410 GO TO KSWH, (5420,5430)                                            FSDL1970
C                                                                        FSDL1980
C            PRINT HEADINGS                                              FSDL1990
 5420 ASSIGN 5430 TO KSWH                                                FSDL2000
      WRITE (6,110)                                                      FSDL2010
 5430 WDELTA = WTMAX - WTC                                               FSDL2020
      WRITE (6,111) I,AZ,NBZ,WTC,WDELTA,WTCC,NPAX                        FSDL2030
C                                                                        FSDL2040
C-->         JUMP HERE TO BYPASS PRINTING        6/12/75                 FSDL2050
 5450 CONTINUE                                                           FSDL2060
      ZI = I - 1                                                         FSDL2070
      ARR(IX) = DELT + (ZI * TBA) + TTO                                  FSDL2080
      NTARR(IX) = IAC                                                    FSDL2090
      NDT = (ARR(IX) / HRSINC) + 1.0                                     FSDL2100
      IF (NDT - 200) 560,560,550                                         FSDL2110
  550 NDT = 200                                                          FSDL2120
  560 WDEL(NDT) = WDEL(NDT) + WTCC                                       FSDL2130
      NDEL(NDT) = NDEL(NDT) + NPAX                                       FSDL2140
      WDELC(NDT) = WDELC(NDT) + WTCC                                     FSDL2150
      NDELC(NDT) = NDELC(NDT) + NPAX                                     FSDL2160
      NACDEP(NDT) = NACDEP(NDT) + 1                                      FSDL2170
      TXMB = ARR(IX) - GRT(INAR)                                         FSDL2180
      NDTB = (TXMB/HRSINC) + 1.                                          FSDL2190
      IF (NDTB - 200) 565,565,564                                        FSDL2200
  564 NDTB = 200                                                         FSDL2210
  565 NACARR(NDTB) = NACARR(NDTB) + 1                                    FSDL2220
      NORMAN (IAC) = NORMAN(IAC) + 1                                     FSDL2230
      IF (IX - 1000) 580,580,570                                         FSDL2240
  570 WRITE (6,106)                                                      FSDL2250
      CALL EXIT                                                          FSDL2260
  580 IX = IX + 1                                                        FSDL2270
```

```
600   CONTINUE                                              FSDL2280
      IF (LIST - LIST1) 660,650,660                         FSDL2290
650   WRITE (6,109)NFX1                                     FSDL2300
      GO TO 140                                             FSDL2310
660   IF (NDS) 140,661,140                                  FSDL2320
661   NLDED = I-1-NBEG                                      FSDL2330
      WRITE (6,107)NLDED, NFX2                              FSDL2340
      GO TO 140                                             FSDL2350
      END                                                   FSDL2360
```

```
CLOAD       SUBROUTINE TO LOAD AIRCRAFT
      SUBROUTINE LOAD(IAC,PAY,LIST,NVT,WT,NPAX,NSIM,NINA)
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NC     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
C     REMOVE ALL TAIL LINES
  300 NIN = 0.0
      DO 301 I = 1, 50
      XL(I) = 0.0
      XR(I) = 0.0
      NTL(I) = 0
      NTL1(I) = 0
  301 STA(I) = 0.0
C     SET SL TO ZERO
  305 SL = 0.0
C     RESET TOTAL WEIGHT LOADED, TOTAL SPACE COVERED AND PAX SPACE
      WT = 0.0
      NPAX = 0
      PAXS = 0.0
      NSIM = 0
      NINA = 0
      LAW = 0
C     SEARCH ROUTINE TO FIND LEFT-MOST GAP
  350 IF ( NIN) 360, 360, 370
C     LOOK FOR GAP BY LEFT WALL
  370 LINE = NTL(1)
      IF ( XL(LINE) ) 371, 371, 380
C     LOOK FOR GAPS BETWEEN LINES
  371 IF ( NIN - 1 ) 376, 376, 372
  372 DO 375 KY = 2, NIN
      LINEL = LINE
      LINE = NTL(KY)
```

```
      IF ( XL(LINE) - XR(LINEL) ) 375, 375, 385
 375  CONTINUE
C     LOOK FOR GAP BY RIGHT WALL
 376  IF (AWID(IAC) - XR(LINE) ) 390,390,386
 360  XF = 0.0
      XT = AWID(IAC)
      GO TO 395
 380  XF = 0.D
      XT = XL ( LINE)
      GO TO 395
 385  XF = XR(LINEL)
      XT = XL ( LINE )
      GO TO 395
 386  XF = XR ( LINE)
      XT = AWID(IAC)
      GO TO 395
C     GAP FOUND, COMPUTE GAP WIDTH AND LENGTH
 395  GWID = XT - XF
      GLENG = ALENG(IAC) - SL
C     COMPUTE PAYLOAD LEFT
      PAYL = PAY - WT
C     FIND BEST VEHICLE
      WMAX = 0.0
      IBEST = 0
      DO 1250 I = 2,NVT
      IF (NSTK(16,I)) 1250,1250,1241
 1241  IF (NSTK(LIST,I) ) 1250,1250,1242
 1242  IF (VLENG(I) - GLENG) 1243,1243,1250
 1243  IF (VWT(I) - PAYL) 1244,1244,1250
 1244  IF (VWD(I) - GWID ) 1245,1245,1250
 1245  IF (VHT(I) - AHT(IAC) ) 1246,1246,1250
 1246  IF (VWD(I) - WMAX) 1250,1250,1247
 1247  WMAX = VWD(I)
       IBEST = I
 1250  CONTINUE
C      IBEST IS THE VEHICLE TO BE LOADED UNLESS IT IS ZERO, IN WHICH CASE
C      NONE IS FEASIBLE
       IF ( IBEST) 250, 250, 396
C      NO VEHICLE WILL FIT THE GAP, ALTER NEAREST TAIL LINE
C      FIND ADJOINING TAIL LINE
C      TEST TO SEE IF IT IS ON THE LEFT WALL
 250   IF ( XF) 251, 251, 255
C      SPACE IS ON LEFT WALL
C      SEE IF ANY LINES ARE IN
 251    IF (NIN) 500, 500, 259
C      AT LEAST ONE LINE IS IN, LINE TO BE EXTENDED IS NTL(1)
 259   LINEX = NTL(1)
       IF (GWID - VWD(1) ) 253,2101,2101
 2101  PAKS = PAKS + STA(LINEX) - SL
C      EXTEND LINE
 253   XL(LINEX) = 0.0
C      JOB COMPLETED, SEARCH FOR A NEW GAP
       GO TO 350
C      SPACE IS NOT ON LEFT WALL, SEE IF IT IS ON RIGHT WALL
 255   IF (XT - AWID(IAC) ) 260,256,256
C      SPACE IS ON RIGHT WALL
 256   LINEX = NTL(NIN)
```

```
      IF (GWID - VWD(1) ) 258,2102,2102                                 LOAD1140
 2102 PAXS = PAXS + STA(LINEX) - SL                                     LOAD1150
C     EXTEND LINE                                                       LOAD1160
  258 XR(LINEX) = AWID(IAC)                                             LOAD1170
C     JOB COMPLETED, SEARCH FOR A NEW GAP                               LOAD1180
      GO TO 350                                                         LOAD1190
C     SPACE IS BETWEEN TWO LINES - LINE AND LINEL                       LOAD1200
C     FIND NEARER LINE                                                  LOAD1210
  260 IF ( STA(LINE) - STA(LINEL) ) 261, 261, 265                       LOAD1220
C     LINE IS CLOSER, EXTEND IT                                         LOAD1230
  261 XL(LINE) = XR(LINEL)                                              LOAD1240
C     JOB COMPLETED, SEARCH FOR A NEW GAP                               LOAD1250
      GO TO 350                                                         LOAD1260
C     LINEL IS CLOSER, EXTEND IT                                        LOAD1270
  265 XR(LINEL) = XL(LINE)                                              LOAD1280
C     JOB COMPLETED, SEARCH FOR A NEW GAP                               LOAD1290
      GO TO 350                                                         LOAD1300
C     VEHICLE FOUND, ADD ITS WEIGHT AND SPACE TO TOTAL LOAD             LOAD1310
  396 WT = WT + VWT(IBEST)                                              LOAD1320
C     ADJUST NUMBER LEFT                                                LOAD1330
      NSTK(LIST,IBEST) = NSTK(LIST,IBEST) - 1                           LOAD1340
      NSTK(16,IBEST) = NSTK(16,IBEST) - 1                               LOAD1350
C     RECORD VEHICLE IN NSAVE                                           LOAD1360
      IF (NINA - 50) 3101,3100,3100                                     LOAD1370
 3100  NINA = 51                                                        LOAD1380
      GO TO 3102                                                        LOAD1390
 3101  NINA = NINA + 1                                                  LOAD1400
      NSAVE(NINA) = IBEST                                               LOAD1410
C     INSERT A NEW LINE IN NTL TO MARK THE END OF THE VEHICLE           LOAD1420
 3102  DO 397 KNEW = 1, 50                                              LOAD1430
      IF ( STA (KNEW) ) 398, 398, 397                                   LOAD1440
  397 CONTINUE                                                          LOAD1450
      GO TO 390                                                         LOAD1460
  398 XL(KNEW) = XF                                                     LOAD1470
      XR(KNEW) = XF + VWD(IBEST)                                        LOAD1480
      STA(KNEW) = VLENG(IBEST) + SL                                     LOAD1490
C     LINE FOUND AND VALUES ASSIGNED, NOW INSERT IN NTL                 LOAD1500
      IF (NIN) 401, 401, 405                                            LOAD1510
  401 NIN = 1                                                           LOAD1520
      NTL(NIN) = KNEW                                                   LOAD1530
      GO TO 439                                                         LOAD1540
  405 DO 420 KZ = 1, NIN                                                LOAD1550
      LINE = NTL(KZ)                                                    LOAD1560
      IF ( XL(KNEW) - 4L(LINE) ) 430, 420, 420                          LOAD1570
  420 CONTINUE                                                          LOAD1580
      NIN = NIN + 1                                                     LOAD1590
      NTL (NIN) = KNEW                                                  LOAD1600
      GO TO 439                                                         LOAD1610
  430 KZP1 = KZ + 1                                                     LOAD1620
      NIN = NIN + 1                                                     LOAD1630
      DO 435 KQ = KZP1, NIN                                             LOAD1640
  435 NTL1(KQ) = NTL(KQ - 1 )                                           LOAD1650
      DO 436 KQ = KZP1, NIN                                             LOAD1660
  436 NTL(KQ) = NTL1(KQ)                                                LOAD1670
      NTL(KZ) = KNEW                                                    LOAD1680
  439 GO TO 350                                                         LOAD1690
C     NO GAP EXISTS, RESET SL                                           LOAD1700
```

```
 390  SL = ALENG(IAC)
      DO 392 K = 1, NIN
      LINEZ = NTL(K)
      IF ( STA(LINEZ) - SL ) 391, 391, 392
C     LINE IS FORWARD OR ABREAST OF PRESENT SL
C     RESET SL
 391  SL = STA(LINEZ)
 392  CONTINUE
C     SL IS NOW RESET
C     REMOVE ALL TAIL LINES ALONG SL
C     SECTION TO REMOVE ALL TAIL LINES WITH STA(I) = SL FROM NTL VECTOR
 450  NREMV = 0
C      SET NTL  TO ZERO FOR LINES TO BE REMOVED
      DO 460 KZ = 1, NIN
      LINE = NTL(KZ)
      IF ( STA(LINE) - SL ) 460, 455, 460
 455  NREMV = NREMV + 1
      NTL(KZ) = 0
      STA(LINE) = 0.0
 460  CONTINUE
      NFOUND = 0
      NINNOW = NIN
      DO 458 KQ = 1, NIN
      IF ( NTL(KQ) ) 451, 451, 458
 451  NZER = 0
      DO 452 KGB = KQ , NINNOW
      IF ( NTL(KGB) ) 462, 462, 463
 462  NZER = NZER + 1
 452  CONTINUE
 463  NFOUND = NFOUND + NZER
      NINNOW = NIN - NFOUND
      DO 453 KM = KQ , NINNOW
      KIRO = KM + NZER
 453  NTL(KM) = NTL ( KIRO )
      IF ( NFOUND - NREMV ) 458, 461, 461
 458  CONTINUE
 461  NIN = NIN - NREMV
C     ALL ADJUSTMENTS MADE - RETURN TO FIND A NEW GAP
      GO TO 350
C     NO VEHICLE WAS FOUND AT A TIME WHEN NO LINES WERE IN, THUS NO
C     MORE CAN BE LOADED IN THIS AIRCRAFT
C     SEE IF THIS IS AN EMPTY AIRCRAFT
C     NO MORE CAN BE LOADED IN THIS AIRCRAFT
 500  IF (SL) 600, 600, 501
C     NO VEHICLES ABOARD
 600  NPAXS = EPAX(IAC)
      LAW = 1
      GO TO 2314
 501  PAXS = PAXS + 2.0* (ALENG(IAC) - SL )
      NPAXS = PAXS / VLENG(1)
2314  NPAXW = (PAY - WT) / VWT(1)
      IF (NPAXS - NPAXW) 2315, 2315, 2320
2315  NPAX = NPAXS
      GO TO 2328
2320  NPAX = NPAXW
2328   IF (NPAX - NSTK(LIST,1) ) 2330,2330,2329
2329   NPAX = NSTK (LIST,1)
```

```
2330 I F(NPAX - NSTK(16,1)) 2340,2340,2335                    LOAD2280
2335 NPAX = NSTK(16,1)                                         LOAD2290
2340 IF (NPAX)  2342,2342,2341                                 LOAD2300
2341  NSTK(LIST,1) = NSTK(LIST,1) - NPAX                       LOAD2310
     NSTK(16,1) = NSTK(16,1) - NPAX                            LOAD2320
     WT = WT + FLOAT(NPAX) * VWT(1)                            LOAD2330
860  IF (NSTK(LIST,1)/NPAX - NSTK(16,1)/NPAX)  865,865,870     LOAD2340
865  NPAXR = NSTK(LIST,1)/NPAX                                 LOAD2350
     GO TO 2342                                                LOAD2360
870  NPAXR = NSTK(16,1) / NPAX                                 LOAD2370
2342 IF (LAW)  3000, 3000, 4102                                LOAD2380
3000  NMIN = 10000000                                          LOAD2390
     IF (NINA - 50 )  910, 910, 850                            LOAD2400
910  DO 950 K1 = 1, NINA                                       LOAD2410
     NENT = 1                                                  LOAD2420
     K1P1 = K1 + 1                                             LOAD2430
     DO 940 K2 = K1P1, NINA                                    LOAD2440
     IF (NSAVE(K2) - NSAVE(K1) )  940,941,940                  LOAD2450
941  NENT = NENT + 1                                           LOAD2460
940  CONTINUE                                                  LOAD2470
     KSP = NSAVE(K1)                                           LOAD2480
     NSP = NSTK(LIST,KSP) / NENT                               LOAD2490
     IF (NSP - NMIN)  945,945,946                              LOAD2500
945  NMIN = NSP                                                LOAD2510
946  NSP = NSTK(16,KSP) / NENT                                 LOAD2520
     IF (NSP - NMIN)  947,947,950                              LOAD2530
947  NMIN = NSP                                                LOAD2540
950  CONTINUE                                                  LOAD2550
960  IF (NPAX)  980,980,965                                    LOAD2560
965  IF (NPAXR - NMIN)  972,972,980                            LOAD2570
4102 LAW = 0                                                   LOAD2580
     IF (NPAX)  971, 971, 972                                  LOAD2590
850  NSIM = 0                                                  LOAD2600
     RETURN                                                    LOAD2610
971  NSIM = 1000000                                            LOAD2620
      RETURN                                                   LOAD2630
972  NSIM = NPAXR                                              LOAD2640
     RETURN                                                    LOAD2650
980  NSIM = NMIN                                               LOAD2660
     RETURN                                                    LOAD2670
     END                                                       LOAD2680
```

```
CMINT     SUBROUTINE TO FIND MINIMUM TIME THROUGH A NETWORK
      SUBROUTINE MINT(CLMAX,SPEEDX,WINDF,TMINX,T3DEST,CLX)
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
      DO 150 I = 1, 50
      IF (NODE(I) ) 160,150,150
  150 CONTINUE
      NEN = 50
      GO TO 200
  160 NEN = I - 1
C     INITIALIZE VECTORS
  200 N1 = NODE(1)
      TMIN(N1) = 0.0
      DO 250 I = 2, NEN
      ND = NODE(I)
      TMIN(ND) = 9999999.0
      CL(ND) = 0.0
  250 NP(ND) = 0
      CL(N1) = 0.0
C     FIND ROUTES
  260 NSW = 0
      DO 500 J = 2, NEN
      JM1 = J - 1
      DO 400 I = 1,NEN
      NFR = NODE(I)
      NTO = NODE(J)
      IF (NFR - NTO) 309,301,301
  301 IF (DIST(NTO,NFR) - 9999990.0) 302,400,400
  302 DEQ = DIST(NTO,NFR)
      GO TO 311
  309 IF (DIST(NFR,NTO) - 9999990.0) 310,400,400
```

```
310   DEQ = DIST(NFR,NTO)                                              MINT0570
311   IF (DEQ - CLMAX) 320,320,400                                     MINT0580
320   TX = (DEQ/SPEEDX ) * (1.0+ GTPFH) +GRT(NTO)+TMIN(NFR)            MINT0590
      IF (TX - TMIN(NTO) ) 330,400,400                                 MINT0600
330   TMIN(NTO) = TX                                                   MINT0610
      NP(NTO) = NFR                                                    MINT0620
      NSW = 1                                                          MINT0630
      IF (DEQ - CL(NFR) ) 335,340,340                                  MINT0640
335   CL(NTO) = CL(NFR)                                                MINT0650
      GO TO 400                                                        MINT0660
340   CL(NTO) = DEQ                                                    MINT0670
400   CONTINUE                                                         MINT0680
500   CONTINUE                                                         MINT0690
      IF (NSW) 510,510,260                                             MINT0700
510   NLQ = NODE(NEN)                                                  MINT0710
      TMINX = TMIN(NLQ)                                                MINT0720
      CLX = CL(NLQ)                                                    MINT0730
      NPX = NP(NLQ)                                                    MINT0740
      IF (NPX - NLQ) 502,503,503                                       MINT0750
502   TGDEST=((GTPFH*DIST(NPX,NLQ)) / (SPEEDX+DIST(NLQ,NPX)))+GRT(NLQ) MINT0760
      GO TO 600                                                        MINT0770
503   TGDEST =((GTPFH*DIST(NLQ,NPX)) / (SPEEDX+DIST(NPX,NLQ)))+GRT(NLQ) MINT0780
600   RETURN                                                           MINT0790
      END                                                              MINT0800
```

```
CNETW        SUBROUTINE TO PERFORM NETWORK ANALYSIS                            NETW0010
      SUBROUTINE NETW (IWAR,NACT,NNODES,IVSP1)                                 NETW0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)NETW0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),   NETW0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),NETW0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),  NETW0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),        NETW0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)NETW0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),  NETW0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                  NETW0100
     8 ,MDEL(200),WDELC(200),MDELC(200)                                  NETW0110
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                       NETW0120
      DIMENSION FILL(250)                                                NETW0130
      REAL*8 ANAME,NAME,NAMEV                                            NETW0140
      REAL*8  NAMEP                                                      NETW0150
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                    NETW0160
      COMMON FILL                                                        NETW0170
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID          NETW0180
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP         NETW0190
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL            NETW0200
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC          NETW0210
      COMMON NSAVE, NTL1,NU,NV,Q                                         NETW0220
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT           NETW0230
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL          NETW0240
      COMMON  WDELC  , MDELC  , HRSINC                                   NETW0250
      COMMON NACARR,NACDEP,NORMAN                                        NETW0260
      EQUIVALENCE (STA(1),FLOW(1)), (NTL(1),NROUT(1)), (XL(1),CL(1)),    NETW0270
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),         NETW0280
     2 (DIST(2002),NSTK(1))                                              NETW0290
   99 FORMAT (43HOPROGRAM STOPPED - DATA CARDS OUT OF ORDER       )      NETW0300
  100 FORMAT (13H1 ROUTES FOR  A6, 9H AIRCRAFT        )                  NETW0310
  101 FORMAT (100HOPROGRAM STOPPED TOO MANY ENTRIES IN WTMV - REDUCE NUMNETW0320
     1BER OF ONLOAD BASES AND/OR AIRCRAFT TYPES                        ) NETW0330
  102 FORMAT (I2,2X,A6,F5.0,8F5.0,2F8.0,F7.0,I2)                         NETW0340
  103 FORMAT (16HO AIRCRAFT DATA    )                                    NETW0350
  104 FORMAT(21H      COMPARTMENT IS  F8.1,7H WIDE,  F8.1, 10H HIGH AND NETW0360
     1 F8.1, 7H LONG (    F6.0, 12H PASSENGERS)  )                       NETW0370
  105 FORMAT (25H      MAXIMUM PAYLOAD IS   F10.1, 20H REDUCED PAYLOAD INETW0380
     1S    F10.1,  12H RANGES ARE    3F9.1  )                            NETW0390
  106 FORMAT (1H )                                                       NETW0400
  107 FORMAT (I2,3X, 15I5 )                                              NETW0410
  108 FORMAT (9H TIME IS  F10.2,14H   PAYLOAD IS  F10.1 )                NETW0420
  109 FORMAT (44HOXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX   )        NETW0430
  110 FORMAT (46HO PROGRAM STOPPED - WAR BASE NOT IN BASE LIST      )     NETW0440
  111 FORMAT (15H      SPEED IS  F8.0, 9H  GTPFH=  F8.2)                 NETW0450
C                                                                        NETW0460
C-->         NEW FORMAT STATEMENT ADDED     6/12/75                      NETW0470
  112 FORMAT (1HO, 12HONLOAD BASE ,I4,                                   NETW0480
     1  25H  IS NOT IN LIST OF BASES /)                                  NETW0490
      CALL RDNT (NNODES)                                                 NETW0500
      CALL NWLK(NNODES,IVSP1)                                            NETW0510
      WRITE (6,106)                                                      NETW0520
  250 IB = 1                                                             NETW0530
      IBP = IB + 13                                                      NETW0540
      IX = 1                                                             NETW0550
      READ (5,107)ISW,IWAR,  (NON(I),I = IB, IBP )                       NETW0560
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```
  251 IF (ISW - 5 ) 999,246,999                                         NETW0570
  246 DO 247 J = 1, NNODES                                              NETW0580
      IF (NO(J) - IWAR ) 247,248,247                                    NETW0590
  247 CONTINUE                                                          NETW0600
      WRITE (6,110)                                                     NETW0610
      CALL EXIT                                                         NETW0620
  248 IWAR = J                                                          NETW0630
  252 DO 258 I = IB, IBP                                                NETW0640
      IF (NON(I)) 259,259,253                                           NETW0650
  253 DO 254 J = 1, NNODES                                              NETW0660
      IF (NO(J) - NON(I))254,255,254                                    NETW0670
  254 CONTINUE                                                          NETW0680
C                                                                       NETW0690
C-->         PRINT MESSAGE IF ONLOAD BASE IS NOT IN INPUT SET           NETW0700
      WRITE (6,112) NON(I)                                              NETW0710
      GO TO 258                                                         NETW0720
  255 NON(IX) = J                                                       NETW0730
      IX = IX + 1                                                       NETW0740
  258 CONTINUE                                                          NETW0750
      IB = IB + 14                                                      NETW0760
      IBP = IB + 13                                                     NETW0770
C                                                                       NETW0780
C-->         CHECK FOR LIMIT ON TOTAL BASES        6/12/75              NETW0790
      IF (IBP.GT.50) IBP = 50                                           NETW0800
      READ (5,107)ISW,IZ,(NON(I),I=IB,IBP)                              NETW0810
C                                                                       NETW0820
C-->         IF NUMBER OF ONLOAD BASES IS A MULTIPLE OF 14, CARD WILL   NETW0830
C-->         NOT TERMINATE WITH ZERO OR BLANK AS EXPECTED.  THE NEXT CARDNETW0840
C-->         SHOULD BE BLANK.                  6/12/75                  NETW0850
      IF (ISW.EQ.0) GO TO 260                                           NETW0860
C-->  IF (ISW - 5) 999,252,260                                          NETW0870
      IF (ISW - 5) 999,252,999                                          NETW0880
  260 NON(IX) = - 1                                                     NETW0890
      GO TO 280                                                         NETW0900
  259 NON(IX) = - 1                                                     NETW0910
      READ (5,107)ISW                                                   NETW0920
      IF (ISW - 5) 280,999,280                                          NETW0930
  280 IT = 1                                                            NETW0940
      DO 500 IAC = 1, 10                                                NETW0950
      READ (5,102)ISW,ANAME(IAC),ANO(IAC),AWID(IAC),AHT(IAC), ALENG(IAC)NETW0960
     1,EPAX(IAC),SPEED(IAC),APAY(IAC,1),APAY(IAC,3),APAY(IAC,5),APAY(IACNETW0970
     2,2),APAY(IAC,4),GTPFH,NBDN                                        NETW0980
      IF (ISW - 6) 210,190,210                                          NETW0990
  190 WRITE (6,100)ANAME(IAC)                                           NETW1000
      WRITE (6,104)AWID(IAC),AHT(IAC),ALENG(IAC)  ,EPAX(IAC)            NETW1010
      WRITE (6,105)APAY(IAC,2),APAY(IAC,4),APAY(IAC,1), APAY(IAC,3),APAYNETW1020
     1(IAC,5)                                                           NETW1030
      WRITE (6,111) SPEED(IAC), GTPFH                                   NETW1040
      CALL SUBN (IAC, IWAR, NNODES,NBDN)                                NETW1050
      DO 400 I = 1,50                                                   NETW1060
      IF (NON(I) ) 500, 500, 310                                        NETW1070
  310 NOL = NON(I)                                                      NETW1080
      CALL SBN2 (NOL, IWAR )                                            NETW1090
      CALL WTIM(IAC)                                                    NETW1100
      NADTB(IAC, NOL) = IT                                              NETW1110
      DO 340 J = 1, 50                                                  NETW1120
      IF (WTM(J) ) 350,340,340                                          NETW1130
```

```
340   CONTINUE                                              NETW1140
      NCT = 50                                              NETW1150
      GO TO 355                                             NETW1160
350   NCT = J - 1                                           NETW1170
355   WTMV(IT) = WTM(NCT- 1)/( WTM(NCT) + TB(NOL) )         NETW1180
      IT = IT + 1                                           NETW1190
      WRITE (6,108) WTM(NCT), WTM(NCT - 1 )                 NETW1200
      WRITE (6,109)                                         NETW1210
      DO 360 K = 1, NCT                                     NETW1220
      KZ = NCT + 1 - K                                      NETW1230
      WTMV(IT) = WTM(KZ)                                    NETW1240
360   IT = IT + 1                                           NETW1250
      WTMV(IT-1) = - WTMV(IT-1 )                            NETW1260
      IF (IT - 2000) 400,400,600                            NETW1270
600   WRITE (6,101)                                         NETW1280
      CALL EXIT                                             NETW1290
400   CONTINUE                                              NETW1300
500   CONTINUE                                              NETW1310
      NACT = 10                                             NETW1320
      READ (5,102)ISW                                       NETW1330
      IF (ISW - 6) 550,999,550                              NETW1340
210   NACT = IAC - 1                                        NETW1350
550   RETURN                                                NETW1360
999   WRITE (6,99)                                          NETW1370
      CALL EXIT                                             NETW1380
      RETURN                                                NETW1390
      END                                                   NETW1400
```

```
CNWLK      SUBROUTINE TO ADD NEW NON-STOP LINKS TO DATA                  NWLK0010
      SUBROUTINE NWLK(NNODES,IVSP1)                                      NWLK0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000) NWLK0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),   NWLK0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),NWLK0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),  NWLK0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),        NWLK0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50) NWLK0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),  NWLK0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                  NWLK0100
     8 ,MDEL(200),WDELC(200),MDELC(200)                                  NWLK0110
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                       NWLK0120
      DIMENSION FILL(250)                                                NWLK0130
      REAL*8 ANAME,NAME,NAMEV                                            NWLK0140
      REAL*8  NAMEP                                                      NWLK0150
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                    NWLK0160
      COMMON FILL                                                        NWLK0170
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID          NWLK0180
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP         NWLK0190
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL            NWLK0200
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC          NWLK0210
      COMMON NSAVE, NTL1,NU,NV,Q                                         NWLK0220
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT           NWLK0230
      COMMON  WDEL   , WTM    , WTMV   , STPPH           , MDEL          NWLK0240
      COMMON  WDELC  , MDELC  , HRSINC                                   NWLK0250
      COMMON NACARR,NACDEP,NORMAN                                        NWLK0260
      EQUIVALENCE (STA(1),FLOW(1)), (NTL(1),NROUT(1)), (XL(1),CL(1)),    NWLK0270
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),         NWLK0280
     2 (DIST(2002),NSTK(1))                                              NWLK0290
  115 FORMAT (40H1 TABLE OF SHORTEST ALLOWABLE DISTANCES       )         NWLK0300
  116 FORMAT (17H0 DISTANCES FROM         A6)                            NWLK0310
  117 FORMAT (    8(3X,A6,F7.0))                                         NWLK0320
      NM1 = NNODES - 1                                                   NWLK0330
      DO 500 I = 1, NM1                                                  NWLK0340
      IP1 = I + 1                                                        NWLK0350
      DO 150 M = 1,  NNODES                                              NWLK0360
      CL(I) = 0.0                                                        NWLK0370
  150 TMIN(M) = 9999999.0                                                NWLK0380
      TMIN(I) = 0.0                                                      NWLK0390
  160 NSW = 0                                                            NWLK0400
      DO 300 J = 1, NNODES                                               NWLK0410
      DO 250 K = 1, NNODES                                               NWLK0420
      IF (J - K ) 241, 250, 242                                          NWLK0430
  241 DX = TMIN(K) + DIST(J,K)                                           NWLK0440
      GO TO 243                                                          NWLK0450
  242 DX = TMIN(K) + DIST(K,J)                                           NWLK0460
  243 IF (DX - TMIN(J) ) 245, 250, 250                                   NWLK0470
  245 TMIN(J) = DX                                                       NWLK0480
      NSW = 1                                                            NWLK0490
  250 CONTINUE                                                           NWLK0500
  300 CONTINUE                                                           NWLK0510
      IF (NSW) 400, 400, 160                                             NWLK0520
  400 IF (IP1 - NNODES) 401, 401, 550                                    NWLK0530
  401 DO 450 M = IP1 , NNODES                                            NWLK0540
  422 DIST (I,M) = TMIN(M)                                               NWLK0550
  450 CONTINUE                                                           NWLK0560
```

```
500   CONTINUE
      IF (IVSP1) 550,550,501
501   WRITE (6,115)
      DO 540 I = 1,NM1
      WRITE (6,116) NAME(I)
      IP1 = I + 1
      WRITE (6,117)  (NAME(J),DIST(I,J),J=IP1,NNODES)
540   CONTINUE
 550  RETURN
      END
```

```
CPAYL     FUNCTION TO COMPUTE MAXIMUM PAYLOAD
      FUNCTION PAYL(I,DX)
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPPH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
      IF (DX    - APAY(I,1) ) 200,200,250
  200 PAYL = APAY(I,2)
      GO TO 500
  250 IF (DX    - APAY(I,3) ) 300,300,350
  300 PAYL=APAY(I,4)+ (APAY(I,3)-DX   )*(APAY(I,2)-APAY(I,4))/(APAY(I,3)
     1 - APAY(I,1) )
      GO TO 500
  350 IF (DX    - APAY(I,5) ) 400,400,450
  400 PAYL = (( APAY(I,5) - DX   ) *  APAY(I,4))/(APAY(I,5)-APAY(I,3))
      GO TO 500
  450 PAYL = 0.0
  500 RETURN
      END
```

```
CPCDL       SUBROUTINE TO PRINT CUMULATIVE DELIVERIES                      PCDL0010
      SUBROUTINE PCDEL(NVT,WTCT,NPAIT,POUT,NACF,IVSP4,IVSP6,NACI)           PCDL0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)PCDL0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),  PCDL0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),PCDL0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50), PCDL0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),       PCDL0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)PCDL0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200), PCDL0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                 PCDL0100
     8 ,HDEL(200),WDELC(200),HDELC(200)                                 PCDL0110
      DIMENSION POUT(51)                                                PCDL0120
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                      PCDL0130
      DIMENSION FILL(250)                                               PCDL0140
      REAL*8 ANAME,NAME,NAMEV                                           PCDL0150
      REAL*8  NAMEP                                                     PCDL0160
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                   PCDL0170
      COMMON FILL                                                       PCDL0180
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID         PCDL0190
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP        PCDL0200
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL           PCDL0210
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC         PCDL0220
      COMMON NSAVE, NTL1,NU,NV,Q                                        PCDL0230
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VHT          PCDL0240
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , HDEL         PCDL0250
      COMMON  WDELC  , MDELC  , HRSINC                                  PCDL0260
      COMMON NACARR,NACDEP,NORMAN                                       PCDL0270
      EQUIVALENCE (STA(1),FLOW(1)), (NTL(1),NROUT(1)), (XL(1),CL(1)),   PCDL0280
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),        PCDL0290
     2 (DIST(2002),NSTK(1))                                             PCDL0300
  100 FORMAT( 90H1 CUMULATIVE DELIVERIES OF MATERIEL AND PERSONNEL FROM PCDL0310
     1ALL PRIORITY GROUPS TO OFFLOAD BASE     )                         PCDL0320
  101 FORMAT(64H0 PERSONNEL   PERCENT OF PERSONNEL   PERCENT OF CARGO  DPCDL0330
     1AY HOUR       )                                                   PCDL0340
  102 FORMAT(1H I10, F20.2, F21.2, I7, I5, 1X, 51A1)                    PCDL0350
  106 FORMAT (1H 64X, 51H-----------------------------------------------PCDL0360
     1----    )                                                         PCDL0370
  108 FORMAT (1H0 F10.2, I7)                                            PCDL0380
  109 FORMAT (24H1 OFFLOAD BASE ACTIVITY    )                           PCDL0390
  110 FORMAT (81H0 **FROM***    ****TO**                                PCDL0400
     1                AIRCRAFT LEFT        )                            PCDL0410
  111 FORMAT (80H  DAY  HOUR     DAY  HOUR    ARRIVALS    DEPARTURES    TOTAPCDL0420
     1L ACTIVITY    AT THE BASE        )                                PCDL0430
  112 FORMAT (1H I4,I5,I8,I5,I11,I13,I16,I14)                           PCDL0440
  113 FORMAT (27H1  AIRCRAFT AVAILABILITY -    A6)                      PCDL0450
  114 FORMAT (14H0  DAY    HOUR    )                                    PCDL0460
  115 FORMAT (1H I5,I6)                                                 PCDL0470
C                                                                       PCDL0480
C-->        ADD LINE OF PRINTING IF DIMENSION EXCEEDED    6/12/75       PCDL0490
  116 FORMAT (/// 41H THE LAST LINE OF THE ABOVE TABLE MAY BE ,         PCDL0500
     1  53HINACCURATE.  ONE OR MORE INDICES EXCEEDED THE LENGTH ,       PCDL0510
     2  13HOF THE TABLE. / 37HOPRINT LESS FREQUENTLY BY INCREASING ,    PCDL0520
     3  44HTHE HOURS IN EACH INCREMENT IN CARD TYPE 00. )               PCDL0530
      TOT = 0.0                                                         PCDL0540
      NTOT = 0                                                          PCDL0550
      DO 501 I = 1, 51                                                  PCDL0560
```

```
      CALL ATHRUZ (Q000HL,6H       )
  501 POUT(I) = (+Q000HL)
      CALL ATHRUZ (Q001HL,6H1      )
      POUT(1) = (+Q001HL)
      CALL ATHRUZ (Q002HL,6H1      )
      POUT(51) = (+Q002HL)
      WRITE (6,100)
      WRITE (6,101)
      WRITE (6,106)
      DO 200 NST = 1, 200
      IF (WDELC(NST) ) 180,180,250
  180 IF (MDELC(NST)) 200,200,250
  200 CONTINUE
      NST = 200
  250 NEND = NST
      IF (NST - 1) 260,260,255
  255 NST = NST - 1
  260 DO 300 I = NST, 200
      IF (WDELC(I) ) 270,270,280
  270 IF (MDELC(I) ) 300,300,280
  280 NEND = I
  300 CONTINUE
      DO 500 I = NST,NEND
      ZIM1 = I
      TIME = HRSINC * ZIM1
      NDAY = TIME / 24.0
      ZNDAY = NDAY
      NHRS = TIME - ZNDAY * 24.0
      TOT = TOT + WDELC(I)
      MTOT = MTOT + MDELC(I)
      PCTC = (TOT/WTCT) * 100.0
      ZMT = MTOT
      ZNPPG = NPAXT
      PCTM = (ZMT/ZNPPG)*100.0
      NPC = (PCTC + 3.0) / 2.0
      NPM = (PCTM + 3.0) / 2.0
      CALL ATHRUZ (Q003HL,6H.      )
      POUT(NPM) = (+Q003HL)
      CALL ATHRUZ (Q004HL,6H*      )
      POUT(NPC) = (+Q004HL)
      WRITE (6,102)MTOT,PCTM,PCTC,NDAY,NHRS,(POUT(K),K=1,51)
      CALL ATHRUZ (Q005HL,6H       )
      POUT(NPM) = (+Q005HL)
      CALL ATHRUZ (Q006HL,6H       )
      POUT(NPC) = (+Q006HL)
      CALL ATHRUZ (Q007HL,6H1      )
      POUT(1) = (+Q007HL)
      CALL ATHRUZ (Q008HL,6H1      )
      POUT(51) = (+Q008HL)
  500 CONTINUE
      WRITE (6,106)
      IF (IVSP6) 800,800,700
C     PRINT OFFLOAD BASE ACTIVITY
  700 WRITE (6,109)
C
C-->        IFLAG WILL = 1 IF NDSP > 200         6/12/75
      IFLAG=0
```

```
      DO 720 I = 1,NACF                                                  PCDL1140
      NDSP = (ARR(I)/HRSINC) + 1.0                                       PCDL1150
C                                                                        PCDL1160
C-->        INSERT CHECK FOR LIMIT ON TIME SLOTS    6/12/75              PCDL1170
      IF (NDSP.LE.200) GO TO 720                                         PCDL1180
      NDSP = 200                                                         PCDL1190
      IFLAG = 1                                                          PCDL1200
 720  NACDEP(NDSP) = NACDEP(NDSP) - 1                                    PCDL1210
      NOG = 0                                                            PCDL1220
      WRITE (6,110)                                                      PCDL1230
      WRITE (6,111)                                                      PCDL1240
      DO 750 I = 1,200                                                   PCDL1250
      ZIM1 = I - 1                                                       PCDL1260
      TMF = HRSINC * ZIM1                                                PCDL1270
      NDF = TMF / 24.                                                    PCDL1280
      NHF = TMF - 24. * FLOAT(NDF)                                       PCDL1290
      TMT = TMF + HRSINC                                                 PCDL1300
      NDT = TMT / 24.                                                    PCDL1310
      NHT = TMT - 24. * FLOAT(NDT)                                       PCDL1320
      NARRV = NACARR (I)                                                 PCDL1330
      NDEPT = NACDEP(I)                                                  PCDL1340
      NTACT = NARRV + NDEPT                                              PCDL1350
      NOG = NOG + NARRV - NDEPT                                          PCDL1360
 750  WRITE (6,112) NDF,NHF,NDT,NHT,NARRV,NDEPT,NTACT,NOG                PCDL1370
C                                                                        PCDL1380
C-->        CHECK IF FLAG > 0                                            PCDL1390
      IF (IFLAG.NE.0) WRITE (6,116)                                      PCDL1400
 800  IF (IVSP4) 900,900,801                                             PCDL1410
C     PRINT AIRCRAFT LIST                                                PCDL1420
 801  DO 850 I = 1, NACT                                                 PCDL1430
      WRITE (6,113) ANAME(I)                                             PCDL1440
      WRITE (6,114)                                                      PCDL1450
      DO 840 J = 1,NACF                                                  PCDL1460
      IF (NTARR(J) - I) 840,830,840                                      PCDL1470
 830  NDY = ARR(J) / 24.                                                 PCDL1480
      NHR = ARR(J) - 24.*FLOAT(NDY)                                      PCDL1490
      WRITE (6,115) NDY,NHR                                              PCDL1500
 840  CONTINUE                                                           PCDL1510
 850  CONTINUE                                                           PCDL1520
 900  RETURN                                                             PCDL1530
      END                                                                PCDL1540
```

```
CPDEL      SUBROUTINE TO PRINT DELIVERIES                                  PDEL0010
      SUBROUTINE PDEL(NVT,TWT,NPAXPG,NPGC,POUT)                             PDEL0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000) PDEL0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),   PDEL0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50), PDEL0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),  PDEL0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),        PDEL0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50) PDEL0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),  PDEL0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                  PDEL0100
     8 ,MDEL(200),WDELC(200),MDELC(200)                                  PDEL0110
      DIMENSION POUT(51)                                                 PDEL0120
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                       PDEL0130
      DIMENSION FILL(250)                                                PDEL0140
      REAL*8 ANAME,NAME,NAMEV                                            PDEL0150
      REAL*8  NAMEP                                                      PDEL0160
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                    PDEL0170
      COMMON FILL                                                        PDEL0180
      COMMON  AHT     , ALENG   , ANAME   , ANO     , APAY    , AWID     PDEL0190
      COMMON  EPAX    , GRT     , JNOW    , LISV    , NAME    , NAMEP    PDEL0200
      COMMON  NAMEV   , NAOTB   , NBASE   , NF      , NFLG    , NL       PDEL0210
      COMMON  NO      , NODE    , NON     , NOV     , NP      , NPAC     PDEL0220
      COMMON NSAVE, NTL1,NU,NV,Q                                         PDEL0230
      COMMON  SPEED   , TB      , VHT     , VLENG   , VWD     , VWT      PDEL0240
      COMMON  WDEL    , WTM     , WTMV    , GTPFH             , MDEL     PDEL0250
      COMMON  WDELC   , MDELC   , HRSINC                                 PDEL0260
      COMMON NACARR,NACDEP,NORMAN                                        PDEL0270
      EQUIVALENCE (STA(1),FLOW(1)), (NTL(1),NROUT(1)), (XL(1),CL(1)),    PDEL0280
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),         PDEL0290
     2 (DIST(2002),NSTK(1))                                              PDEL0300
  100 FORMAT(59H1 DELIVERIES OF MATERIEL AND PERSONNEL FROM PRIORITY GROPDEL0310
     1UP   I5, 16H TO OFFLOAD BASE      )                                PDEL0320
  101 FORMAT(64H0 PERSONNEL    PERCENT OF PERSONNEL    PERCENT OF CARGO  DPDEL0330
     1AY HOUR        )                                                   PDEL0340
  102 FORMAT(1H I10, F20.2, F21.2, I7, I5, 1X, 51A1)                     PDEL0350
  103 FORMAT (40H1 ITEMS IN PRIORITY GROUP NOT DELIVERED     )           PDEL0360
  106 FORMAT (1H 64X, 51H---------------------------------------------------PDEL0370
     1----     )                                                         PDEL0380
      TOT = 0.0                                                          PDEL0390
      MTOT = 0                                                           PDEL0400
      DO 501 I = 1, 51                                                   PDEL0410
      CALL ATHRUZ (Q000HL,6H       )                                     PDEL0420
  501 POUT(I) = (+Q000HL)                                                PDEL0430
      CALL ATHRUZ (Q001HL,6H1      )                                     PDEL0440
      POUT(1) = (+Q001HL)                                                PDEL0450
      CALL ATHRUZ (Q002HL,6H1      )                                     PDEL0460
      POUT(51) = (+Q002HL)                                               PDEL0470
      WRITE (6,100) NPGC                                                 PDEL0480
      WRITE (6,101)                                                      PDEL0490
      WRITE (6,106)                                                      PDEL0500
      DO 200 NST = 1, 200                                                PDEL0510
      IF ( WDEL(NST) ) 180,180,250                                       PDEL0520
  180 IF (MDEL(NST) ) 200,200,250                                        PDEL0530
  200 CONTINUE                                                           PDEL0540
      NST = 200                                                          PDEL0550
  250 NEND = NST                                                         PDEL0560
```

```
      IF (NST - 1) 260,260,255                                        PDEL0570
255   NST = NST - 1                                                   PDEL0580
260   DO 300 I = NST, 200                                             PDEL0590
      IF (WDEL(I) ) 270,270,280                                       PDEL0600
270   IF (MDEL(I) ) 300,300,280                                       PDEL0610
280   NEND = I                                                        PDEL0620
300   CONTINUE                                                        PDEL0630
      DO 500 I = NST,NEND                                             PDEL0640
      ZIM1 = I                                                        PDEL0650
      TIME = HRSINC * ZIM1                                            PDEL0660
      NDAY = TIME / 24.0                                              PDEL0670
      ZNDAY = NDAY                                                    PDEL0680
      NHRS = TIME - ZNDAY * 24.0                                      PDEL0690
      TOT = TOT + WDEL(I)                                             PDEL0700
      MTOT = MTOT + MDEL(I)                                           PDEL0710
      PCTC = (TOT/TWT)*100.0                                          PDEL0720
      ZMT = MTOT                                                      PDEL0730
      ZNPPG = NPAXPG                                                  PDEL0740
      PCTM = (ZMT/ZNPPG)*100.0                                        PDEL0750
      NPC = (PCTC + 3.0) / 2.0                                        PDEL0760
      NPM = (PCTM + 3.0) / 2.0                                        PDEL0770
      CALL ATHRUZ (Q003HL,6H.     )                                   PDEL0780
      POUT(NPM) = (+Q003HL)                                           PDEL0790
      CALL ATHRUZ (Q004HL,6H*     )                                   PDEL0800
      POUT(NPC) = (+Q004HL)                                           PDEL0810
      WRITE (6,102)MTOT,PCTM,PCTC,NDAY,NHRS,(POUT(K),K=1,51)          PDEL0820
      CALL ATHRUZ (Q005HL,6H      )                                   PDEL0830
      POUT(NPM) = (+Q005HL)                                           PDEL0840
      CALL ATHRUZ (Q006HL,6H      )                                   PDEL0850
      POUT(NPC) = (+Q006HL)                                           PDEL0860
      CALL ATHRUZ (Q007HL,6H1     )                                   PDEL0870
      POUT(1) = (+Q007HL)                                             PDEL0880
      CALL ATHRUZ (Q008HL,6H1     )                                   PDEL0890
      POUT(51) = (+Q008HL)                                            PDEL0900
      WDEL(I) = 0.0                                                   PDEL0910
      MDEL(I) = 0                                                     PDEL0920
500   CONTINUE                                                        PDEL0930
      WRITE (6,106)                                                   PDEL0940
      WRITE (6,103)                                                   PDEL0950
      IVSPX = 1                                                       PDEL0960
510   CALL PRPG (NVT,TWT,NPAXPG,IVSPX)                                PDEL0970
      RETURN                                                          PDEL0980
      END                                                             PDEL0990
```

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CPRPG      SUBROUTINE TO PRINT PRIORITY GROUP DATA                       PRPG0010
      SUBROUTINE PRPG (NVT,TWT,NPAXPG,IVSP5)                             PRPG0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000) PRPG0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),   PRPG0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50), PRPG0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),  PRPG0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),        PRPG0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50) PRPG0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),  PRPG0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                  PRPG0100
     8 ,HDEL(200),WDELC(200),HDELC(200)                                  PRPG0110
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                       PRPG0120
      DIMENSION FILL(250)                                                PRPG0130
      REAL*8 ANAME,NAME,NAMEV                                            PRPG0140
      REAL*8  NAMEP                                                      PRPG0150
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                    PRPG0160
      COMMON FILL                                                        PRPG0170
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID          PRPG0180
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP         PRPG0190
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL            PRPG0200
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC          PRPG0210
      COMMON NSAVE, NTL1,NU,NV,Q                                         PRPG0220
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT           PRPG0230
      COMMON  WDEL   , WTM    , WTMV   , STPPH           , HDEL          PRPG0240
      COMMON  WDELC  , HDELC  , HRSINC                                   PRPG0250
      COMMON NACARR,NACDEP,NORMAN                                        PRPG0260
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),      PRPG0270
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),         PRPG0280
     2 (DIST(2002),NSTK(1))                                              PRPG0290
  101 FORMAT (28H0 VEHICLES IN PRIORITY GROUP  )                         PRPG0300
  102 FORMAT (69H0  NAME      NUMBER    WIDTH     HEIGHT     LENGTH    WEIGHPRPG0310
     1T    QUANTITY       )                                              PRPG0320
  103 FORMAT (1H A6,I9,4F10.1, I11 )                                     PRPG0330
  104 FORMAT(20H0 CARGO WEIGHT IS      F10.2,6H TONS   ,23H NUMBER OF PEPRPG0340
     1RSONNEL IS             I10)                                        PRPG0350
  105 FORMAT(17H0 CARGO COVERS     F10.1,48H THOUSAND SQUARE FEET OF FLOOPRPG0360
     1R SPACE, AND WEIGHS    F10.2, 24H POUNDS PER SQUARE FOOT       )   PRPG0370
      IF (IVSP5) 109,109,108                                             PRPG0380
  108 WRITE (6,101)                                                      PRPG0390
      WRITE (6,102)                                                      PRPG0400
  109 TWT = 0.0                                                          PRPG0410
      TSP = 0.0                                                          PRPG0420
      DO 200 I = 1, NVT                                                  PRPG0430
      IF (NSTK(16,I)) 200,200,150                                        PRPG0440
  150 TWT = TWT + VWT(I)  * FLOAT(NSTK(16,I))                            PRPG0450
      TSP = TSP + VWD(I)*VLENG(I)*FLOAT(NSTK(16,I))                      PRPG0460
      IF (IVSP5) 200,200,155                                             PRPG0470
  155 WRITE (6,103)NAMEV(I),NV(I),VWD(I),VHT(I),VLENG(I), VWT(I), NSTK(1PRPG0480
     16,I)                                                               PRPG0490
  200 CONTINUE                                                           PRPG0500
      NPAXPG = NSTK(16,1)                                                PRPG0510
      ZNPX = NPAXPG                                                      PRPG0520
      TWT = TWT - ZNPX * VWT(1)                                          PRPG0530
      TSP = TSP - (ZNPX*VWD(1)*VLENG(1))                                 PRPG0540
      TWTT = TWT / 2000.                                                 PRPG0550
      TSPF = TSP /144.                                                   PRPG0560
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      DENS = TWT / TSPF                                                 PRPG0570
      TSPF = TSPF/1000.                                                 PRPG0580
      WRITE (6,104) TWTT, NPAXPG                                        PRPG0590
      WRITE (6,105) TSPF, DENS                                          PRPG0600
      RETURN                                                            PRPG0610
      END                                                               PRPG0620
```

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CRDNT      SUBROUTINE TO READ NETWORK DATA                                  RDNT0010
      SUBROUTINE RDNT (NNODES)                                              RDNT0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)  RDNT0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),    RDNT0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),  RDNT0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),   RDNT0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),         RDNT0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)  RDNT0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),   RDNT0090
     7 WTH(50),WTHV(2000),XL(50),XR(50)                                    RDNT0100
     8 ,MDEL(200),WDELC(200),MDELC(200)                                    RDNT0110
      DIMENSION ZLONG(50), ZLAT(50)                                        RDNT0120
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                         RDNT0130
      DIMENSION FILL(250)                                                  RDNT0140
      REAL*8 ANAME,NAME,NAMEV                                              RDNT0150
      REAL*8  NAMEP                                                        RDNT0160
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                      RDNT0170
      COMMON FILL                                                          RDNT0180
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID            RDNT0190
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP           RDNT0200
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL              RDNT0210
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC            RDNT0220
      COMMON NSAVE, NTL1,NU,NV,Q                                           RDNT0230
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT             RDNT0240
      COMMON  WDEL   , WTH    , WTHV   , GTPFH           , MDEL            RDNT0250
      COMMON  WDELC  , MDELC  , HRSINC                                     RDNT0260
      COMMON NACARR,NACDEP,NORMAN                                          RDNT0270
      EQUIVALENCE (STA(1),FLOW(1)), (NTL(1),NROUT(1)), (XL(1),CL(1)),     RDNT0280
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),          RDNT0290
     2 (DIST(2002),NSTK(1))                                                RDNT0300
C                                                                          RDNT0310
C-->         1/13/76                                                       RDNT0320
C-->         CHANGE FORMAT TO CORRESPOND TO CARD TYPE 03 DESCRIPTION       RDNT0330
C-101 FORMAT (I2,2X,A6,I5,F5.0,F7.0,F3.0,F7.0,F3.0)                         RDNT0340
 101  FORMAT (I2,2X,A6,I5,F5.0,F7.0,1X,F2.0,F7.0,1X,F2.0)                   RDNT0350
 102  FORMAT (I2, 3X, 2I5, 2F5.0 )                                         RDNT0360
 103  FORMAT (38HOPROGRAM STOPPED MORE THAN 50 NODES          )            RDNT0370
 104  FORMAT (1H 30X,A6,I8,F13.2,F10.0,F9.0,F13.0,F10.0 )                  RDNT0380
 105  FORMAT (27H1 BASES USED IN DEPLOYMENT         )                      RDNT0390
 106  FORMAT(1H030X,71H  NAME   NUMBER   GROUND TIME  DEG LAT  MIN LAT     RDNT0400
     1   DEG LONG  MIN LONG       )                                        RDNT0410
 107  FORMAT (1H )                                                         RDNT0420
 108  FORMAT (13H1 LINKS INPUT     )                                       RDNT0430
 109  FORMAT(30X,32H FROM         TO         DISTANCE       )              RDNT0440
 111  FORMAT(1H 30X,A6,5X,A6,F14.1)                                        RDNT0450
 112  FORMAT (1H 30X,2I5,20X,42HLINK REJECTED - BASE MISSING IN BASE LISRDNT0460
     1T          )                                                         RDNT0470
 114  FORMAT (1H 30X,A6,5X,A6,17H      LINK DENIED      )                  RDNT0480
C     READ NODE DATA                                                       RDNT0490
      I = 1                                                                RDNT0500
      WRITE (6,105)                                                        RDNT0510
      WRITE (6,106)                                                        RDNT0520
      WRITE (6,107)                                                        RDNT0530
 150  READ (5,101)ISW,NAME(I),NO(I),GRT(I),ZLATD,ZLATM, ZLONGD, ZLONGM     RDNT0540
      IF (ISW - 3) 164,160,164                                             RDNT0550
 160  WRITE (6,104)NAME(I),NO(I),GRT(I),ZLATD,ZLATM, ZLONGD, ZLONGM        RDNT0560
C                                                                          RDNT0570
C-->         1/13/76                                                       RDNT0580
C-->                                                                       RDNT0590
C-->         IF DEGREE FIELD IS NEGATIVE, SET MINUTES NEGATIVE             RDNT0600
```

```
C-->        ZERO IS ALWAYS A POSITVIE NUMBER IN THE SYSTEM 370 FORTRAN
C-->        IN ORDER TO REGISTER A NEGATIVE ZERO,
C-->        THE USER SHOULD ENTER -360 FOR ZERO DEGREES AND NON ZERO
C-->        MINUTES.  THE PROGRAM WILL RESET THE DEGREES TO ZERO AFTER
C-->        CHECKING THE SIGN OF THE DEGREES AND SETTING THE MINUTES.
C
      IF (ZLATD.LT.0.0)  ZLATM  = -(ABS(ZLATM))
      IF (ZLONGD.LT.0.0) ZLONGM = -(ABS(ZLONGM))
      IF (ABS(ZLATD).EQ.360.0)  ZLATD  = 0.0
      IF (ABS(ZLONGD).EQ.360.0) ZLONGD = 0.0
      ZLAT(I) = (ZLATD + ZLATM/60.0) / 57.2957795
      ZLONG(I) = (ZLONGD + ZLONGM/60.0) / 57.2957795
      IF ( I - 50) 161,162,162
  161 I = I + 1
      GO TO 150
  162 READ (5,101)ISW
      I = I + 1
  164 IF (ISW - 3) 180,163,180
  163 WRITE (6,103)
      CALL EXIT
  180 NNODES = I - 1
      WRITE (6,108)
      WRITE (6,109)
      WRITE (6,107)
C     SORT NODE TABLE
  185 NSW = 0
      DO 200 I = 2, NNODES
      IM1 = I - 1
      IF (NO(I) - NO(I-1) ) 190,200,200
  190 NSW = 1
      NOX = NO(IM1)
      NAMEX = NAME(IM1)
      GRTX = GRT(IM1)
      ZLATX = ZLAT (IM1)
      ZLONGX = ZLONG (IM1)
      NO(IM1) = NO(I)
      NAME(IM1) = NAME(I)
      GRT(IM1) = GRT(I)
      ZLAT (IM1) = ZLAT(I)
      ZLONG(IM1) = ZLONG (I)
      NO(I) = NOX
      NAME(I) = NAMEX
      GRT(I) = GRTX
      ZLAT(I) = ZLATX
      ZLONG (I) = ZLONGX
  200 CONTINUE
      IF (NSW) 201,201,185
  201 NM1 = NNODES - 1
      DO 370 I = 1,NM1
      IP1 = I + 1
      DO 365 J = IP1,NNODES
  310 XI = COS(ZLAT(I)) * COS(ZLONG(I))
      XJ = COS(ZLAT(J)) * COS(ZLONG(J))
      YI = COS(ZLAT(I)) * SIN(ZLONG(I))
      YJ = COS(ZLAT(J)) * SIN(ZLONG(J))
      ZI = SIN(ZLAT(I))
      ZJ = SIN(ZLAT(J))
      COSNA = XI*XJ + YI*YJ + ZI*ZJ
      SINA = SQRT(1.0-COSNA**2)
      DISTX = 3433.98 * ATAN2 (SINA,COSNA)
  360 DIST(I,J) = DISTX
```

```
  365 CONTINUE                                                        RDNT1220
  370 CONTINUE                                                        RDNT1230
C     READ LINK DATA                                                  RDNT1240
  210 READ (5,102)ISW,NFR,NTO,DISTX                                   RDNT1250
      IF (ISW- 4 ) 500, 215, 500                                      RDNT1260
  215 IF (NFR - NTO) 220,216,216                                      RDNT1270
  216 NXYZ = NTO                                                      RDNT1280
      NTO = NFR                                                       RDNT1290
      NFR = NXYZ                                                      RDNT1300
C     CONVERT TO NODE NUMBERS                                         RDNT1310
  220 DO 240 I = 1,NNODES                                             RDNT1320
      IF (NO(I) - NFR) 240,250,240                                    RDNT1330
  240 CONTINUE                                                        RDNT1340
      GO TO 301                                                       RDNT1350
  250 DO 260 J = 1, NNODES                                            RDNT1360
      IF (NO(J) - NTO) 260,270,260                                    RDNT1370
  260 CONTINUE                                                        RDNT1380
  301 WRITE (6,112)NFR, NTO                                           RDNT1390
      GO TO 210                                                       RDNT1400
  270 IF (DISTX) 400,400,410                                          RDNT1410
  400 DIST(I,J) = 9999999.0                                           RDNT1420
      WRITE (6,114) NAME(I),NAME(J)                                   RDNT1430
      GO TO 210                                                       RDNT1440
  410 DIST(I,J) = DISTX                                               RDNT1450
      WRITE (6,111) NAME(I),NAME(J),DISTX                             RDNT1460
      GO TO 210                                                       RDNT1470
  500 RETURN                                                          RDNT1480
      END                                                             RDNT1490
```

```
CRDPG       SUBROUTINE TO READ DATA ON A PRIORITY GROUP
      SUBROUTINE RDPG (NVT,ISW,NPGC)
      DIMENSION AHT(10),ALENG(10),ANAME(10),AND(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAK(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION NFSP(9)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , AND    , APAY   , AWID
      COMMON  EPAK   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
   99 FORMAT (43HOPROGRAM STOPPED - DATA CARDS OUT OF ORDER        )
  100 FORMAT(17H1 PRIORITY GROUP   I4)
  101 FORMAT(I2, 3X,9I2,F7.0,2I5)
  103 FORMAT(6H FLAGS 24X,25H  QUANTITY   UNIT   LIST       )
  104 FORMAT(1H 2X,9I3,F10.2,I6,I8)
      NNEW = 0
      NSW = 0
      DO 140 IZ = 1,NVT
  140 NSTK(16,IZ) = 0
  150 READ(5,101) ISW, (NFSP(I),I=1,9),Q(1),NU(1),NL(1)
      IF (ISW - 8) 170,200,170
  170 IF (ISW - 10) 500,200,500
  200 IZ = 16
      IF (NSW) 201,201,175
  201 WRITE(6,100) NPGC
      WRITE (6,103)
      NSW = 1
  175 DO 180 I = 1,9
  180 NF(I) = NFSP(I)
      WRITE (6,104) (NF(I),I=1,9), Q(1), NU(1),NL(1)
      CALL STLS(IZ,NVT,NNEW)
      GO TO 150
  500 RETURN
      END
```

```
CRDST      SUBROUTINE TO READ STOCK DATA
      SUBROUTINE RDST(NSTL,NVT,NNODES )
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPPH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)), (NTL(1),NROUT(1)), (XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
   99 FORMAT(44HOPROGRAM STOPPED - MORE THAN 15 STOCK LISTS       )
  101 FORMAT (I2,3X,2I5,F5.0,2I5)
  102 FORMAT (40HC FLAG   BASE   QUANTITY   UNIT    LIST       )
  103 FORMAT (19H1 STOCK LISTS       )
  104 FORMAT (1H I4,2X,A6,F11.2,I6,I8)
  105 FORMAT(29H         LIST REJECTED - BASE I5,18H NOT IN BASE LIST   )
      WRITE (6,103)
      WRITE (6,102)
      DO 140 I = 1,16
      DO 140 J = 1, NVT
  140 NSTK(I,J)  = 0
      NFLS = 0
      NBLS = 0
      IZ = 0
  150 READ  (5,101) ISW,NFX,NBX,Q(1),NU(1),NL(1)
      IF (ISW - 7) 500,200,500
  200 IF (NFX - NFLS) 205,201,205
  201 IF (NBX - NBLS) 205,210,205
  205 IZ = IZ + 1
      NNEW = 1
  210 IF (IZ - 15) 220,220,999
  220 DO 250 M = 1, NNODES
      IF (NO(M) - NBX ) 250,260,250
  250 CONTINUE
      WRITE (6,105) NBX
      IF (NNEW) 150,150,256
  256 IZ = IZ - 1
```

```
      GO TO 150                                                         RDST0570
  260 NBLS = NBX                                                        RDST0580
      NPLS = NPX                                                        RDST0590
      WRITE (6,104) NPX, NAME(M),Q(1),NU(1),NL(1)                       RDST0600
      NBASE (IZ) = M                                                    RDST0610
      NPLG(IZ) = NPX                                                    RDST0620
      CALL STLS(IZ,NVT,NNEW)                                            RDST0630
      NNEW = 0                                                          RDST0640
      GO TO 150                                                         RDST0650
  500 NSTL = IZ                                                         RDST0660
      RETURN                                                            RDST0670
  999 WRITE (6,99)                                                      RDST0680
      CALL EXIT                                                         RDST0690
      RETURN                                                            RDST0700
      END                                                               RDST0710
```

```
CSBN2      SUBROUTINE TO FIND ROUTES OUT AND BACK
      SUBROUTINE SBN2 (NOL,IWAR)
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,NDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , NDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
  100 FORMAT (19H0MINIMUM TIME FROM  A6,4H TO A6,4H IS F10.2 )
  101 FORMAT (10H ROUTE IS      )
  102 FORMAT (1H 10(A6,6X) )
  103 FORMAT (25H0MAXIMUM-FLOW ROUTE FROM   A6,4H TO A6,4H IS   )
C     FIND ROUTE BACK
      I = NOL
      DO 200 J = 1, 50
      NROUT(J) = I
      IF (I - IWAR) 180,210,180
  180 I = NSAVE(I)
  200 CONTINUE
      GO TO 250
  210 NROUT(J+1) = - 1
C     PRINT ROUTE BACK
  250 IX = 1
      DO 300 I = 1, J
      NX = J + 1 - I
      ND = NROUT(NX)
      NAMEP(IX) = NAME(ND)
      IX = IX + 1
  300 CONTINUE
      WRITE (6,100)NAME(IWAR), NAME(NOL), TB(NOL)
      WRITE (6,101)
      WRITE (6,102) (NAMEP(I),I = 1,J )
C      FIND ROUTE OUT
      I = NOL
      DO 400  J = 1, 50
```

```
      NODE(J) = I                                                       SBN20570
      IF (I - IWAR) 380,410,380                                         SBN20580
  380 I = NSUBN(NOL, I)                                                 SBN20590
  400 CONTINUE                                                          SBN20600
      GO TO 450                                                         SBN20610
  410 NODE(J+1) = - 1                                                   SBN20620
C     PRINT ROUTE OUT                                                   SBN20630
  450 IX = 1                                                            SBN20640
      DO 500 I = 1, J                                                   SBN20650
      ND = NODE(I)                                                      SBN20660
      NAMEP(IX) = NAME(ND)                                              SBN20670
      IX = IX + 1                                                       SBN20680
  500 CONTINUE                                                          SBN20690
      WRITE (6,103) NAME(NOL), NAME(IWAR)                               SBN20700
      WRITE (6,102) (NAMEP(I),I=1,J )                                   SBN20710
  750 RETURN                                                            SBN20720
      END                                                               SBN20730
```

```
CSTLS       SUBROUTINE TO STORE LIST OF VEHICLES                              STLS0010
      SUBROUTINE STLS (IZ,NVT,NNEW)                                           STLS0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)STLS0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),      STLS0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),STLS0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),   STLS0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),           STLS0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)STLS0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),    STLS0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                      STLS0100
     8 ,MDEL(200),WDELC(200),MDELC(200)                                      STLS0110
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                           STLS0120
      DIMENSION FILL(250)                                                     STLS0130
      REAL*8 ANAME,NAME,NAMEV                                                 STLS0140
      REAL*8  NAMEP                                                           STLS0150
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                         STLS0160
      COMMON FILL                                                             STLS0170
      COMMON  AHT     , ALENG  , ANAME  , ANO    , APAY   , AWID             STLS0180
      COMMON  EPAX    , GRT    , JNOW   , LISV   , NAME   , NAMEP            STLS0190
      COMMON  NAMEV   , NAOTB  , NBASE  , NF     , NFLG   , NL               STLS0200
      COMMON  NO      , NODE   , NON    , NOV    , NP     , NPAC             STLS0210
      COMMON NSAVE, NTL1,NU,NV,Q                                              STLS0220
      COMMON  SPEED   , TB     , VHT    , VLENG  , VWD    , VWT              STLS0230
      COMMON  WDEL    , WTM    , WTMV   , GTPPH           , MDEL             STLS0240
      COMMON  WDELC   , MDELC  , HRSINC                                       STLS0250
      COMMON NACARR,NACDEP,NORMAN                                             STLS0260
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),         STLS0270
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),            STLS0280
     2 (DIST(2002),NSTK(1))                                                   STLS0290
  106 FORMAT(28H PORTION USING VEHICLE LIST I5,34H REJECTED - LIST NUMBESTLS0300
     1R EXCEEDS 5      )                                                      STLS0310
  107 FORMAT(20H PORTION USING UNIT I5,44H REJECTED - UNIT NUMBER MUST BSTLS0320
     1E FROM 1 TO 11        )                                                 STLS0330
  301 NUX = NU(1)                                                             STLS0340
      IF (NUX) 388,388,302                                                    STLS0350
  302 IF (NUX - 11) 303,303,388                                               STLS0360
  388 WRITE (6,107)NUX                                                        STLS0370
  460 IF (NNEW) 450,450,465                                                   STLS0380
  465 IZ = IZ - 1                                                             STLS0390
      GO TO 400                                                               STLS0400
  303 QTY = Q(1)                                                              STLS0410
      IF ( NL(1) ) 309,320,329                                                STLS0420
  309 NLX = -NL(1)                                                            STLS0430
      IF (NLX - 5 ) 310,310,399                                               STLS0440
  399 WRITE (6,106)NLX                                                        STLS0450
      IF (NNEW) 450,450,465                                                   STLS0460
  500 GO TO 400                                                               STLS0470
  310 DO 315 K = 1,NVT                                                        STLS0480
      DO 312 L = 1,100                                                        STLS0490
      IF (LISV(NLX,L) ) 313,313,311                                           STLS0500
  311 IF (LISV(NLX,L) - K ) 312,315,312                                       STLS0510
  312 CONTINUE                                                                STLS0520
  313 NA = QTY * FLOAT(NOV(K,NUX) ) + .99                                     STLS0530
      NSTK(IZ,K) = NSTK(IZ,K) + NA                                            STLS0540
  315 CONTINUE                                                                STLS0550
      GO TO 400                                                               STLS0560
```

```
320   DO 325 K = 1,NVT                                        STLS0570
      NA = QTY * FLOAT(NOV(K,NUX) ) + .99                     STLS0580
325   NSTK(IZ,K) = NSTK(IZ,K) + NA                            STLS0590
      GO TO 400                                               STLS0600
329   NLX = NL(1)                                             STLS0610
      IF (NLX - 5 ) 330,330,399                               STLS0620
330   DO 335 K = 1,NVT                                        STLS0630
      DO 332 L = 1,100                                        STLS0640
      IF (LISV(NLX,L) ) 335,335,331                           STLS0650
331   IF (LISV(NLX,L) - K ) 332,334,332                       STLS0660
332   CONTINUE                                                STLS0670
      GO TO 335                                               STLS0680
334   NA = QTY * FLOAT(NOV(K,NUX) ) + .99                     STLS0690
      NSTK(IZ,K) = NSTK(IZ,K) + NA                            STLS0700
335   CONTINUE                                                STLS0710
400   CONTINUE                                                STLS0720
450   RETURN                                                  STLS0730
      END                                                     STLS0740
```

```
CSUBN     SUBROUTINE TO FIND NODE SUBNETWORK                              SUBN0010
      SUBROUTINE SUBN(IAC,IWAR,NNODES,NBDN)                               SUBN0020
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000) SUBN0030
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),   SUBN0040
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50), SUBN0050
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),  SUBN0060
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),        SUBN0070
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50) SUBN0080
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),  SUBN0090
     7 WTM(50),WTMV(2000),XL(50),XR(50)                                  SUBN0100
     8 ,MDEL(200),WDELC(200),MDELC(200)                                  SUBN0110
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)                        SUBN0120
      DIMENSION FILL(250)                                                 SUBN0130
      REAL*8 ANAME,NAME,NAMEV                                             SUBN0140
      REAL*8  NAMEP                                                       SUBN0150
      COMMON STA,NTL,XL,XR,DIST,NSUBN                                     SUBN0160
      COMMON FILL                                                         SUBN0170
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID           SUBN0180
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP          SUBN0190
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL             SUBN0200
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC           SUBN0210
      COMMON NSAVE, NTL1,NU,NV,Q                                          SUBN0220
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT            SUBN0230
      COMMON  WDEL   , WTM    , WTMV   , GTPPH           , MDEL           SUBN0240
      COMMON  WDELC  , MDELC  , HRSINC                                    SUBN0250
      COMMON NACARR,NACDEP,NORMAN                                         SUBN0260
      EQUIVALENCE (STA(1),FLOW(1)),(NTL(1),NROUT(1)),(XL(1),CL(1)),       SUBN0270
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),         SUBN0280
     2 (DIST(2002),NSTK(1))                                               SUBN0290
      CALL THBK (IWAR, SPEED(IAC),APAY(IAC,5),NNODES,NBDN)                SUBN0300
      DO 150 I = 1, NNODES                                                SUBN0310
      FLOW (I) = 0.0                                                      SUBN0320
      NSAVE(I) = NP(I)                                                    SUBN0330
  150 TB(I) = TMIN(I)                                                     SUBN0340
      WINDF = 1.0                                                         SUBN0350
      CLM = APAY(IAC,5)                                                   SUBN0360
  160 CALL MINT (CLM,SPEED(IAC),WINDF,THINK,TGDEST,CX)                    SUBN0370
      CLMX = 0.0                                                          SUBN0380
      DO 200 I = 1,NNODES                                                 SUBN0390
      ND = NON(I)                                                         SUBN0400
      IF (ND) 210,210,170                                                 SUBN0410
  170 FLW= PAYL(IAC,CL(ND))/(TMIN(ND) + TB(ND) )                          SUBN0420
      IF (FLW - FLOW(ND) ) 196,196,180                                    SUBN0430
  180 FLOW (ND) = FLW                                                     SUBN0440
      DO 190 J = 1, NNODES                                                SUBN0450
  190 NSUBN (ND,J) = NP(J)                                                SUBN0460
  196 IF (CL(ND) - CLMX) 200,200,197                                      SUBN0470
  197 CLMX = CL(ND)                                                       SUBN0480
  200 CONTINUE                                                            SUBN0490
  210 IF (CLM - APAY(IAC,1) ) 500,500,205                                 SUBN0500
  205 IF (CLMX ) 500,500,302                                              SUBN0510
  302 CLM = CLMX - 1.0                                                    SUBN0520
      GO TO 160                                                           SUBN0530
  500 RETURN                                                              SUBN0540
      END                                                                 SUBN0550
```

```
CTMBK     SUBROUTINE TO COMPUTE TIME BACK FROM WAR
      SUBROUTINE TMBK (IWAR,SPEEDX,RANGE,NNODES,NBDN)
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)), (NTL(1),NROUT(1)), (XL(1),CL(1)),
     1 (XR(1),TMIN(1)),  (DIST(1),ARR(1)),  (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
C
C-->        CHANGE FORMAT STATEMENT        6/12/75
C101  FORMAT (5X, I5,I5)
 101  FORMAT (5X, 15I5)
 102  FORMAT (14H DENIED BASES    20I5)
      NP1 = NNODES + 1
      NODE(1)= IWAR
      IF (NBDN) 106,106,105
 105  READ (5,101) (NSAVE(I),I=1,NBDN)
      WRITE (6,102) (NSAVE(I),I=1,NBDN)
 106  IZ = 2
      DO 200 I = 2, NP1
      IX = NNODES + 2 - I
      IF(IX - IWAR) 140,200,140
 140  IF (NBDN) 150,150,141
 141  DO 145 K = 1,NBDN
      IF ( NO(IX) - NSAVE(K) ) 145,200,145
 145  CONTINUE
 150  NODE(IZ) = IX
      IZ = IZ + 1
 200  CONTINUE
      WINDF = - 1.0
      IF (IZ - 50) 250,250,300
 250  NODE(IZ) = -1
 300  CALL MINT(RANGE,SPEEDX,WINDF,TMINX,TGDESF,CLX)
      RETURN
      END
```

```
CWTIM        SUBROUTINE TO FIND WEIGHT-TIME TABLE
      SUBROUTINE WTIM(IAC)
      DIMENSION AHT(10),ALENG(10),ANAME(10),ANO(10),APAY(10,5),ARR(1000)
     1,AWID(10),CL(50),DIST(50,50),EPAX(10),FLOW(50),GRT(50),JNOW(10),
     2 LISV(5,100),NAME(50),NAMEP(50),NAMEV(200),NAOTB(10,50),NBASE(50),
     3 NF(9),NFLG(50),NL(7),NO(50),NODE(50),NON(50),NOV(200,11),NP(50),
     4 NPAC(10,50),NROUT(50),NSAVE(50),NSTK(16,200),NSUBN(50,50),
     5 NTARR(1000),NTL(50),NTL1(50),NU(7),NV(200),Q(7),SPEED(10),STA(50)
     6,TB(50),TMIN(50),VHT(200),VLENG(200),VWD(200),VWT(200),WDEL(200),
     7 WTM(50),WTMV(2000),XL(50),XR(50)
     8 ,MDEL(200),WDELC(200),MDELC(200)
      DIMENSION NACARR(200),NACDEP(200),NORMAN(10)
      DIMENSION FILL(250)
      REAL*8 ANAME,NAME,NAMEV
      REAL*8  NAMEP
      COMMON STA,NTL,XL,XR,DIST,NSUBN
      COMMON FILL
      COMMON  AHT    , ALENG  , ANAME  , ANO    , APAY   , AWID
      COMMON  EPAX   , GRT    , JNOW   , LISV   , NAME   , NAMEP
      COMMON  NAMEV  , NAOTB  , NBASE  , NF     , NFLG   , NL
      COMMON  NO     , NODE   , NON    , NOV    , NP     , NPAC
      COMMON NSAVE, NTL1,NU,NV,Q
      COMMON  SPEED  , TB     , VHT    , VLENG  , VWD    , VWT
      COMMON  WDEL   , WTM    , WTMV   , GTPFH           , MDEL
      COMMON  WDELC  , MDELC  , HRSINC
      COMMON NACARR,NACDEP,NORMAN
      EQUIVALENCE (STA(1),FLOW(1)), (NTL(1),NROUT(1)), (XL(1),CL(1)),
     1 (XR(1),TMIN(1)), (DIST(1),ARR(1)), (DIST(1001),NTARR(1)),
     2 (DIST(2002),NSTK(1))
      WINDF = 1.0
      I = 1
      CLM = APAY(IAC,5 )
  150 CALL MINT(CLM, SPEED(IAC), WINDF,TMINX,TGDEST,CLX)
      IF (CLX) 155,155,160
  155 WTM(I) = - 1
      RETURN
  160 WTM(I) = PAYL(IAC,CLX )
      WTM(I+1 ) = TMINX
      IF (CLX - APAY(IAC,1 ) ) 300,300,200
  200 IF (I - 49) 250,301,301
  250 I = I + 2
      CLM = CLX - 1.0
      GO TO 150
  300 WTM(I + 2 ) = - 1.0
  301 RETURN
      END
```

```
ATHRUZ   CSECT
         SAVE   (14,12)
         DS     OH
         STM    14,12,12(13)  SAVE REGISTERS
         BALR   2,0
         USING  *,2
         ST     13,SAVE+4
         LA     13,SAVE
         L      3,0(0,1)
         L      4,4(0,1)
         MVC    0(4,3),0(4)
         L      13,SAVE+4
         RETURN (14,12)
         LM     14,12,12(13)  RESTORE THE REGISTERS
         BR     14 RETURN
         DS     18F
         END
```

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